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THE ZOOLOGIST:

A
POPULAR MONTHLY MAGAZINE
OF
NATURAL HISTORY,
AND
JOURNAL FOR RECORDING FACTS AND ANECDOTES

RELATING TO

QUADRUPEDS, BIRDS, REPTILES, FISHES, ANNELIDES,
INSECTS, WORMS, ZOOPHYTES, &c.

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Three Days among the Bats in Clare.

By JOHN ROBERT KINAHAN, M.D., F.L.S., M.R.I.A.*

So few are the opportunities naturalists enjoy of studying the habits of bats in their native haunts, that, without further apology, I think I may venture to lay before the public details of three days' researches in the caves situated in the northern extremity of the county of Clare, in company with Mr. F. Foot, who had the good fortune to discover there, and record for the first time in Ireland, in 1859, the lesser horseshoe bat (*Rhinolophus hipposideros*), a species which must now, I think, be looked on as the bat of Clare, an opinion Mr. Foot has already put forward. In one or two trivial points I find that Mr. Foot's deductions from his own researches were too general; but in the main the observations which he has already published (Proc. Nat. Hist. Soc. vol. ii.) are fully borne out by those made during the tour at present described. As will appear, during this tour only one species of bat was met with, although the localities examined are far apart.

The caves are all situated in the same geologic horizon, the upper limestone. This rock throughout the entire neighbourhood is drilled and bored with caverns, often of great extent, with numerous passages and windings, serving, in many cases, as water-courses for the "buried" rivers which give rise to the sink-holes and turloughs for which the district of the Burren is famous. Whether it is to the presence and number of these caverns, or to the peculiar position of the district, that the occurrence of this species of bat in such abundance is due, may be a question; my own judgment, however, leads to the latter solution, judging by the plants and animals which frequent the district in question.

The Burren may be reckoned one of the most interesting of Irish districts, whether we look to its geological formation or its inhabitants; hundreds of acres of a formation seen nowhere else in Ireland—I had almost said in Great Britain—to such an extent, without seemingly a fault or break; bearing on its surface the manifest traces of ocean action, in high water-worn cliffs and coves far inland, in a surface nearly entirely destitute of soil, and in its picturesque scenery. On it, wherever a plant can grow, the Botany exhibited is such as is seen nowhere else in Ireland. The maidenhair fern (*Adiantum Capillus-Veneris*) grows in extreme luxuriance, and by the acre: that remarkable plant, Potentilla fruticosa, not known elsewhere in Ireland; Ajuga pyramidalis, hitherto only met with in the Isle of Man; and other plants of a similar kind, here grow in such luxuriance as no other part of Ireland can display. The hart's-tongue fern, filling every nook and cranny, exhibits a luxuriance of growth and variety of form which I have never seen approached, far less equalled, in any other district; Grammitis Ceterach, the maidenhair spleenwort (*Asplenium Trichomanes*), the wall rue and the black-stalked spleenwort, all brave the extreme fury of the western blasts, and, forsaking the neighbourhood of man, in which alone they are generally found in other places, plant themselves in every nook and crevice of the rocks and cliffs; the sea-side spleenwort attains a size, luxuriance and height which must be seen to be believed, and in its characters approaches to a Jamaican form. The yew clothes the bare cliffs; and Gentiana verna, Dryas octopetala, Helianthemum canum, and Saxifrages clothe every bank.

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* Read before the Natural History Society of Dublin, June 7, 1861. Communicated by the Author.

Of the animals it is scarcely necessary to speak. The curious Crustacea, such as Pisa tetraodon, Xantho florida and X. rivulosa, Athanas nitescens, &c.; the Echinoderms, such as Gaertner's spoon-worm, Thallasema Neptuni, T. Sepunculi and T. Holothuriæ; the mollusks and Actiniæ, of rare forms, found in nearly every creek, point to a district severed, as far as distribution is concerned, from all the rest of Ireland, and render it probable that to the same source, *viz.*, the prevalence of a peculiar district-distribution, is to be attributed the occurrence and abundance of the bat referred to. But these speculations I hope to treat of more fully hereafter, and therefore pass at once to the proper subject of this paper.

Our first day's research (March 8th) was in caves near Inchiquin Lough. The first cave searched opens to the south, in the face of a picturesque limestone cliff, bounding one side of a deep ravine, destitute of trees except and odd stunted ash, but hung with the commoner ferns. Here we did not meet with any bats. We next proceeded to Vigo cave; this is at the edge of Inchiquin Lough, at the side of the road, at the verge of a dense plantation, and facing about E.S.E. The mouth of the cavern exhibits a fine geological section at the entrance, the roof being coal-measures, which, as the cave rapidly descends, is replaced by the lower limestone, crowded with fossils. The entrance of the cave externally is festooned with ivy, and tapestried with ferns, the most abundant of which are the hart's-tongue (*Phyllitis Scolopen-*

drium), maidenhair spleenwort (*Asplenium Trichomanes*), and the male fern (*Dryopteris Filix-mas*). A few plants of the lady fern (*Athyrium Filix-fœmina*), were just beginning to show their heads when our first visit was paid.

The access to the cave is by a steep slope, down which, at the time of our visit, a tiny stream was flowing, which soon lost itself in the rubbish on the floor of the cave. Having gained the bottom, the cave proceeds for some distance pretty much on a level, the floor being composed of a slippery tenacious clay of considerable depth ; it then narrows, gradually ascends, and at length further progress is barred by a high cliff, up which we did not ascend, as the cave terminates at a short distance from this point. The breadth of the passage is moderate throughout, and the roof, in parts low, becomes, near the cliff, so lofty that our candles barely sufficed to show it in an indistinct gloom. I may observe that the clay in the floor of the cave was bored and caverned, either by badgers or otters, the track of whose feet might be plainly seen. A few stalactites of small size hung in parts from the roof, and the cave was tolerably dry ; in one or two places there were small pools of water, but though I searched these carefully I could find no traces of the blind Acarinæ which had occurred so abundantly to me in the caves of Dunmore, Co. Kilkenny, in a similar situation. We had not long lighted our candles and proceeded into the gloom, when my companion captured a lesser horseshoe bat, hanging from a crevice in one of the side walls of the cave, at a point where daylight was visible. In our progress to the end of the cave we captured another specimen of the same species, hanging near to the ground. When we reached the lofty chamber already spoken of we found the traces of the excrement of bats very abundant, and indistinctly through the gloom we could make out the forms of one or two bats, seemingly of considerable size, hanging from the roof, but far out of reach. During our return another specimen was found, near the place where the second specimen had been captured ; and after the lights were extinguished, at the very mouth of the cave, in broad daylight, Mr. Foot detected a fourth. All these specimens were males. The only other living thing seen in the cave was a moth (*Triphosa dubitaria*), which was by no means rare, and found in all parts of the cave, even the darkest.

We next proceeded to the plantations on the western shore of the lake : here, in a cliff covered in profusion with ferns,—especially that lovely variety of the common polypody (*Ctenopteris vulgaris*) to which the names "hibernicum," "semilacerum," "pseudo-cambricum," "sinuatum," &c., have been given,—are two caves of small extent, not more than a few yards deep, and facing northward and eastward, their mouths embowered in trees and hung with ferns. In the first of these we did not meet with any bats; in the second, which is extremely small and dirty, I found two bats, and numbers of a large mottled spider which I have not yet identified. Both the bats were males, and both were visible in the daylight.

A few days afterwards we examined some caves near Kilcorney: the first of these scarcely deserved the name of a cave, being a large chink in the face of a cliff totally destitute of trees, open throughout to the full blaze of the sunlight, insomuch that the sides of the cave to its very end were hung with maidenhair spleenwort (*Asplenium Trichomanes*). The second cave—*par excellence, the* cave of Kilcorney—is of very great extent; the mouth is small, and so narrow at one part that we could only squeeze and wriggle in sideways, and a fashionable lady would certainly have stuck. The roof of some of the passages is so low that one requires to crawl flat: it is a fine example of an under-ground river. The roof exhibited many traces, such as streams, &c., of the recent passage of water, which had gained access by the numerous vertical clefts and shafts, with which the roof abounds; and the pebbles and rocks on the floor were much rounded and water-worn, like those in the bed of a brook. The heavy rain which was falling outside rendered the examination of this cave hazardous, as floods come on very rapidly: we therefore spent only an hour in the cave, during which time a considerable number of passages were examined, but fruitlessly as regarded bats, the only living creature met with being a small frog found by me at the farthest point; probably it had been carried in by the winter floods. The absence of bats is not to be wondered at, as, during winter floods, a strong stream issues out of and completely fills the mouth of the cave; and a farmer in the neighbourhood told us that only two days previously to our visit the stream coming out had been so strong as to flood the adjacent meadow.

Our next day's excursion (March 22nd) was to the caves near Ennis. The first we visited was Balliallia cave; here Mr. Foot first discovered the horse-shoe bat, on the 10th of March, 1859; and in his paper (Proc. Nat Hist. Soc. Dub. ii. 152) he gives the following graphic description of the cave:—

"The cave penetrates nearly twenty yards in a westerly direction, through strata of limestone, which dip to the east at an angle of five or ten degrees. The entrance is through a hole in the ground, four feet square, on the slope of a hill facing the east. The interior is divided into three compartments. Descending a few feet, we reach the door-way, which is four feet wide by three feet six inches in height; its sides built of dry masonry, and a large flag of limestone for the lintel. Passing through it, we stand, or rather stoop, in the first compartment, which is eight feet long, five high, averages five feet in width, and contracts at its further end to an aperture two feet wide, by which the second compartment is entered.

"We now take leave of the daylight, and, lighting a candle, perceive that we are in a chamber twenty-two feet in length, ten in width, and nine feet in height. Evidences of human occupation of the cave are also seen here, as there is a bench of rough stone-work, two feet high, at each side, probably erected by distillers of illicit whiskey, as report says that formerly this cave was one of their places of resort. The ceiling presents a varied appearance, being in some places rough with projecting points, which form nooks and crannies; while in others the flat under-surface of the beds of rock appear fretted with incipient stalactites. I call them incipient, as they do not attain to any length, but form a kind of bead-work arranged in polygons. From this, through an opening one foot six inches wide, we creep into the third compartment. It may be described as a rugged cell, twenty-four feet in length, varying from two to four in width, and averaging four in height." Although not surrounded itself with trees, the cave faces a plantation only a few feet distant from it.

The day of our research was a very fine one, but the weather previously had been very severe, with sleet and rain and wind, the former in many places lying piled up unmelted. The innermost and middle chambers of the cave were very wet, and there was a good deal of moisture even in the outer chamber. Here we met with nineteen bats, all males except one. Of these, six were in the dark part of the outer chamber, hanging separately and at every height from the floor of the cave; seven were in the middle chamber, also hanging at various heights, one being only a couple of inches from the ground; and six were in the last chamber, five closely crowded together, but not clinging to each other, and dripping with wet. The ground was in parts quite black with their dirt. The other animals found here were the moth and large spiders already spoken of, and gnats in great numbers; the latter were alive, but seemingly torpid, as, unless touched, they did not stir. It was most interesting to see the bats wincing from the light. I examined each specimen carefully, and found they were all of the one species, and the greater part full-grown. Mr. Foot seemed to think that the fact of some of these bats being met with in wet parts of the cavern was due to their roosting-place having become wet subsequently to its selection.

We then proceeded to Ennis, and, Dr. George O'Brien kindly accompanying us, we drove out to Edenvale. Here we examined three caves, likewise in the limestone, the general external features of which were all similar; they are situate in a dense old plantation: the entrances of the caves were hung with ivy, and the variety of Ctenopteris vulgaris already spoken of.

In the first cave, which is of considerable extent, and very wet in parts, we met with twenty-one bats; the greater part of them hung in company, in a tolerably dry side-alley of the cave. I examined the bats, and found all here to be males. The moths occurred in this cave also. The second cave, which is very small and low, I examined alone; it was very dry. I only found one male bat. The last cave examined is very capacious, with numerous side passages, some of which are so low and narrow as to oblige you to crawl through them; there are ponds of water, too, which require caution. Here we met with five bats, one of which was a female; they were scattered through different parts of the cave, all in the dark, and the female was hanging alone. Spiders, gnats and wood-lice also occurred. The narrow passage terminates rather abruptly in a deep well, which might easily entrap an incautious explorer.

The last opportunity I had of exploring a bat cave was on Easter Monday (April 1), a lovely spring day, the first of the season; when, being again in the neighbourhood of Vigo, we paid that cave a second visit. I found two bats only, the weather having been mild and open for some days previously, as was shown by the numerous wheatears (seen for the first time in the Burren on the 27th of March) flitting about, and by the chiffchaff, which, for the first time, I heard this day in every grove and plantation I passed through. Singularly enough both the bats were females, though on our previous visit, more than three weeks before, all the four specimens met with were males. We did not revisit the other caves in this neighbourhood.

From these observations one or two general deductions may be drawn. In the first place, the number of specimens met with (fifty-four) being all of the same species, coupled with the fact that it has occurred at places as far apart as Inchiquin, Ennis and Quin, according to Mr. Foot, to which must also be added the neighbourhood of the town of Galway (as shown by a specimen captured by Prof. William King in 1858), giving an extensive Irish range of distribution for the species, justify us in considering this the characteristic bat of Clare.

Next, the fact that out of eight caves examined (for we may exclude the chink at Kilcorney as too light) the bats occurred in six,—all of which were either in plantations or close to them, and most of them had their entrances hung with plants,— shows, in addition, that to the proximity of woods, to which the animals can resort in summer, is probably due their selection of these caves. Of the two caves from which the bats were absent, in the great cave at Kilcorney no terrestrial animals could exist through the winter, owing to the floods; the second cave, at Inchiquin, is very small.

Another point, already put forward by Mr. Foot, which may be looked upon as proven, is the fact that the sexes hybernate apart. I took great pains to be accurate as regards this, and examined every specimen myself individually; yet out of the fifty-four I only found *one* female to nineteen bats at Balliallia, and *one* female to twenty-seven at Edenvale, which occurred in the third cave, and in a separate part of the cave from that in which its four fellow tenants were hung; and *two* females were the sole denizens of Vigo cave on our second visit: *four* to *fifty-four*, a very great disparity. It may be recollected that though Mr. Foot records having examined twenty specimens in 1859, he only met with *one* female. I am sure that we did not leave any part of the caves visited unexamined, except the roof of the last chamber in Vigo cave; and I think it likely that the two females which we met with there had awakened from their hybernation, in some other part of the cave, probably this chamber, under the influence of the mild weather, and had gone to sleep again.

With regard to the kind of place the bats select, although some of those in Balliallia were dripping with wet, they, as a rule, certainly prefer the dry places, and also, I think, the darkest spots, as they are much more numerous and in a deeper sleep in such parts of the cave as are most deeply sunk in the gloom. On the other hand, it must be recollected that in nearly every case we found specimens in the daylight. In Vigo cave the bat was visible after the candles had been extinguished.

The numbers found congregated in the one place in Edenvale, and in Balliallia cave, show that solitude is not the constant habit of the bat. They certainly shift their quarters during their hybernation. In the third cave examined at Edenvale I found recent traces of the bats in several places from which the bats were then absent, and the two females captured at Vigo had not been where we found them at our previous visit. It is probable that they find food, during these partial awakings, in the moths, gnats and spiders met with, in every cave, in company with them.

On a former visit of mine to Balliallia cave, in August, 1859, I could not find any trace of bats, although Mr. Foot found them there the March previous. This, coupled with our finding them so abundant on our present visit, shows that the surmise as to the animal's change of habitat in summer is correct. I am thus particular about the habits of these animals because so little is known of them. Of the specimens captured I brought several home, and placed them under a box; they lived with me for eight days, and, although they refused to eat, soon accommodated themselves to their quarters. One which escaped gave us a favourable opportunity of judging of their skill in avoiding objects about the room, and also in rising from flat surfaces. They scrambled and fought a good deal at night, but were quiet during the day. On several of them I found specimens of a large and disgusting-looking tick. The great proportion of the bats were full-grown, only about a tenth of the number being immature; these differed in no respect from the others, except in a lightness of colour and in the characters of their dentition.

J. R. Kinahan.

Extraordinary Assemblage of Shrew Mice.—While walking a few days ago with two friends along a beautiful country road near the seat of Sir Michael R. S. Stewart, Bart., at Inverkiss, on the Clyde, we were surprised to hear an unusual rustling in the dead leaves and grass at the bottom of the hedge. As naturalists always do, we stopped to discover the cause, and judge of our astonishment when we saw between one hundred and one hundred and fifty shrew mice running nimbly about, uttering their peculiar sharp cry. Our presence did not seem to disturb them, for they continued chasing and calling on one another. We tried to catch some of them, and one of our number, by putting his hand opposite to a shrew, had the pleasure of seeing it walking in. It died before morning, being smothered in the box in which it had been confined. I have always considered that they lived in pairs, and were not gregarious, and I have invariably found them to shun observation, and exhibit a dread and fear of man, but in this instance both of my previous ideas of their habits were overturned, for here they were in scores, surprising us with their boldness and bravery. I tried to bag one, and it was only after making a dash at some score of them that I caught one. When I tried to catch any, they would suddenly make a wheel backwards, and, uttering a shrill cry, turn right round and cross instantly over the spot where my hand had been. When caught the little fellow showed fight, but his long pig-like nose saved my fingers from any harm. All the time we were there they continued to cry and run about, seemingly making themselves very happy. Perhaps some of the readers of the

'Zoologist' can give me an explanation as to whether it was a birth, death or marriage they were celebrating, or perhaps a general migration?—*William N. McCartney; 98, Hutcheson Street, Glasgow, May* 21, 1861.

Singular Advertisements.—I was amused at reading Mr. Broadbent's advertisement, reprinted at Zool. 7187. I send one to match it from the 'Calcutta Exchange Gazette' of April, 1861.

TO PROPRIETORS OF MENAGERIES.—For sale, a wonderful animal, called a MYTTON (of the male species), found in, and peculiar to, the wilds of Assam. As this extraordinary animal is rarely procurable it offers a splendid opportunity to those Gentlemen who wish to add to their Menagerical curiosities. Cash price Rs. 350. Apply to the Printer.

The said creature is a fine young bull gayal (*Bos frontalis*), since purchased by my friend Bábu Najendra Malliká. He ought to be shipped for England forthwith, for, however healthy now, it is quite certain that he has no chance of surviving the hot and rainy seasons of Lower Bengal.—*E. Blyth; Calcutta, April* 4, 1861.

Notes on the Birds of Belgium. By HENRY L. SAXBY, Esq.

(Continued from p. 7543).

Goldencrested Regulus (*Regulus cristatus*). Common in winter, but not often seen in summer.

Firecrested Regulus (*R. ignicapillus*). Of common occurrence in winter, frequenting woods and hedges, sometimes in company with R. cristatus, which it very much resembles in habits and general appearance. In severe weather I have more than once observed it upon the limes on the Boulevard de Waterloo.

Great Titmouse (*Parus major*). Permanent. One, which had been in confinement for a few hours only, was remarkably familiar, and would take hemp seeds from the hand, resting them between its feet while it broke them open with its bill.

Blue Titmouse (*P. cæruleus*). Permanent.

Marsh Titmouse (*P. palustris*). Not uncommon in low grounds.

Longtailed Titmouse (*P. caudatus*). Permanent.

Pied Wagtail (*Motacilla Yarrellii*). Permanent. One evening in October a flock, consisting of upwards of forty individuals, flew close above me in a north-easterly direction, directly against a strong breeze.

Gray Wagtail (*M. boarula*). Chiefly in spring and autumn, only a very few remaining to breed.

Grayheaded Wagtail (*M. flava*). Arrives early in April and leaves in September. Extremely abundant in low meadows and near rivers, feeding upon small worms, larvæ, aquatic insects, small univalves, and sometimes upon small winged insects. The nest is not very difficult to find, being usually situated among coarse grass and low bushes near the bank of a stream. In form it is not unlike that of the pied wagtail, but the nature of the materials varies considerably in different nests. One now in my possession is made of hay, flowering heads of grasses, a few very fine roots, two or three feathers, silky cocoons of several kinds, and a small quantity of moss, the whole being neatly lined with fine grass, wool and feathers. The eggs are pale buffy white, mottled all over with several shades of grayish yellow. A few small blackish lines may sometimes be observed upon the larger end. I never found more than six eggs in one nest, although the birdcatchers assured me that they had seen as many as eleven.

Tree Pipit (*Anthus arboreus*). Arrives about the middle of April.

Meadow Pipit (*A. pratensis*). Permanent.

Skylark (*Alauda arvensis*). Permanent. Cream-coloured and light brown varieties were much valued by the dealers, and were always offered at a high price.

Woodlark (*A. arborea*). Permanent?

*Lapland Bunting (*Emberiza calcarata*). On the 5th of March, 1853, I saw three living specimens in the hands of a collector, by whom they had just been purchased in the market. Their fortunate owner refused to afford me any information as to the time and place of their capture, but the worn appearance of their quills and tail-feathers, led me to imagine that they had been in confinement for several days at least.

Snow Bunting (*E. nivalis*). Occasionally visits the coast in winter.

Common Bunting (*E. miliaria*). Permanent.

Blackheaded Bunting (*E. schœniclus*). Permanent.

Yellowhammer (*E. citrinella*). Permanent.

Cirl Bunting (*E. cirlus*). Occasional.

Ortolan Bunting (*E. hortulana*). A summer visitor, appearing towards the end of April, and continuing to arrive in considerable numbers until the second week in May, by which time many of the females have already begun to lay. Its departure takes place soon after the young of the latest broods have become fully fledged, but I have observed stragglers as late as the 9th of September. Though it visits most parts of the country, it seems to prefer those districts which are well drained and not very thickly wooded. Its note is a single loud chirp, repeated at irregular intervals, but sometimes so rapidly as to resemble an attempt at a song. Its small, shallow nest is placed on the ground in a field of young corn, seldom far from trees, and is composed of grass, small stalks of plants and fine roots, lined with fine grass and horsehair. The eggs are pale purplish white, with a few spots and streaks, and sometimes also with small comma-shaped marks of deep purple brown. In autumn great numbers of these birds are caught and fattened for the table. When in their most perfect condition the only part of the body which remains without fat is a narrow line along the middle of the breast.

Chaffinch (*Fringilla cœlebs*). Permanent.

Mountain Finch (*F. montifringilla*). Winter. A male in full summer plumage was seen by me in a small wood near Ixelles, on the 7th of May, 1853. Possibly it had escaped from confinement, for at that time many of the same species were still to be seen caged in the markets and elsewhere.

Tree Sparrow (*F. montana*). Permanent.

House Sparrow (*F. domestica*). Permanent.

Greenfinch (*F. chloris*). Permanent.

Hawfinch (*F. coccothraustes*). Permanent. The young are sometimes fledged by the end of May.

Goldfinch (*F. carduelis*). Permanent.

Siskin (*F. spinus*). Winter.

Linnet (*F. cannabina*). Permanent.

Lesser Redpole (*F. linaria*). Permanent?

Mealy Redpole (*F. borealis*). Winter. In spring the breast and rump of the male change from dull pinkish white to pure rose-colour.

Mountain Linnet (*F. Montium*). Occasional. Winter.

Bullfinch (*Loxia pyrrhula*). Permanent.

Crossbill (*L. curvirostra*). There can be but little doubt that it occasionally breeds in the Forest of Soignies, from whence I have obtained young birds scarcely fledged in July.

Starling (*Sturnus vulgaris*). Permanent.

Carrion Crow (*Corvus corone*). Permanent.

Rook (*C. frugilegus*). Permanent.

Jackdaw (*C. monedula*). Permanent.

Magpie (*C. pica*). Permanent.

Jay (*C. glandarius*). Permanent.

Nutcracker (*Nucifraga caryocatactes*). Occasional.

Green Woodpecker (*P. viridis*). Permanent. I once found turnip seed in the stomach.

Spotted Woodpecker (*P. major*). Permanent. Fresh eggs were brought to me as early as the 28th of June.

Creeper (*Certhia familiaris*). Permanent. In winter the Park at Brussels is a favourite resort.

Wren (*Troglodytes europæus*). Permanent.

Hoopoe (*Upupa epops*). Occasional.

Nuthatch (*Sitta europæa*). Said to breed in the Forest of Soignies, but I did not even see the bird itself in the breeding season, and, indeed, at all times experienced great difficulty in procuring specimens.

Cuckoo (*Cuculus canorus*). Summer.

Kingfisher (*Alcedo ispida*). Permanent. Breeds annually in the banks of the Senne, within a mile of Brussels.

Swallow (*Hirundo rustica*). Summer.

Martin (*H. urbica*). Summer.

Sand Martin (*H. riparia*). Summer. Very abundant in the immediate neighbourhood of Brussels, particularly among the sand-pits near the Quatres Louise.

Swift (*Cypselus apus*). Summer.

Nightjar (*Caprimulgus europæus*). Summer.

Ring Dove (*Columba palumbus*). Permanent and abundant, the numerous beech woods affording it both food and shelter.

Stock Dove (*C. œnas*). Summer.

Turtle Dove (*C. turtur*). Summer.

Pheasant (*Phasianus colchicus*). Permanent.

*Black Grouse (*Tetrao tetrix*). Occasionally seen in the markets in autumn and winter, but only in very small numbers.

Partridge (*Perdix cinerea*). Permanent.

*Redlegged Partridge (*P. rubra*). Permanent?

Quail (*P. coturnix*). Summer.

Bustard (*Otis tarda*). Occasional.

Golden Plover (*Charadrius pluvialis*). Winter.

Dotterel (*C. morinellus*). Ocasional. Summer. A male caught in August lived for some weeks in a large cage, feeding upon earthworms and hard-boiled yolk of egg.

Ringed Plover (*C. hiaticula*). Permanent.

Kentish Plover (*C. cantianus*). Winter.

Little Ringed Plover (*C. minor*). Permanent. The eggs are much like those of C. hiaticula, but smaller and more finely dotted.

Gray Plover (*Vanellus melanogaster*). Winter.

Lapwing (*V. cristatus*). Permanent.

Turnstone (*Strepsilas interpres*). Winter.

Heron (*Ardea cinerea*). Permanent.

Purple Heron (*A. purpurea*). This handsome bird used formerly to breed regularly in many parts of the country, but it is now comparatively rare, even in winter.

Bittern (*A. stellaris*). Occasional.

Little Bittern (*A. minuta*). Occasional. Not unfrequently seen in the Brussels markets.

Redshank (*Totanus calidris*). Common in winter. I have been informed that a few breed regularly every year upon the banks of the Meuse.

Green Sandpiper (*T. ochropus*). Spring and autumn.

Wood Sandpiper (*T. glareola*). Spring and autumn.

Common Sandpiper (*T. hypoleucos*). Summer. I saw two of these birds early in March, while snow was still upon the ground.

*Spotted Sandpiper (*T. macularius*). Two specimens now in my collection were purchased by me on the 15th of March, 1853. They were lying in a shop window, among a number of dunlins and ringed plovers, where they would probably have escaped my notice, had not my attention been attracted by their pale reddish brown feet and legs. I was unable to ascertain from whence they came in the first instance, they having been obtained in the market a few hours previously, but the absence of any marine odour suggested the probability of their having been shot inland. Upon dissection they both proved to be females. The stomachs contained coarse gravel and a few minute worms.

Greenshank (*Totanus glottis*). Occasional.

Blacktailed Godwit (*Limosa melanura*). Spring and autumn.

Ruff (*Machetes pugnax*). Summer.

Woodcock (*Scolopax rusticola*). Winter.

Great Snipe (*S. major*). Occasional. Winter.

Common Snipe (*S. gallinago*). Winter. A few remain to breed.

Jack Snipe (*S. gallinula*). Winter.

Curlew Sandpiper (*Tringa subarquata*). Occasional. Autumn.

Little Stint (*T. minuta*). Autumn.

Dunlin (*T. variabilis*). Permanent.

Landrail (*Gallinula crex*). Summer.

Spotted Crake (*G. porzana*). Summer. Arrives about the end of March. In its habits it differs very little from the water rail, but is far more restless and shy.

Little Crake (*G. pusilla*). Occasional.

Moorhen (*G. chloropus*). Permanent.

Water Rail (*Rallus aquaticus*). Abundant in winter.

Coot (*Fulica atra*). Permanent.

Brent Goose (*Anser bernicla*). Winter. Very seldom seen inland.

Shoveller (*Anas clypeata*). Winter.

Pintail Duck (*A. acuta*). Winter.

Wild Duck (*A. boschas*). Permanent.

Garganey (*A. querquedula*). Spring and autumn.

Teal (*A. crecca*). Permanent.

Wigeon (*A. penelope*). Winter.

*Redcrested Whistling Duck (*A. rufina*). Very rare. I saw but one, and that was a female, which was in a shop in Brussels, on the 15th of April, 1853. It was supposed to have been killed somewhere near the Scheldt, but the precise spot was unknown.

Pochard (*A. ferina*). Winter. It probably breeds in Belgium, for young birds are frequently seen in the markets in August.

Tufted Duck (*A. fuligula*). Winter.

Goldeneye (*A. clangula*). Winter.

Redbreasted Merganser (*Mergus serrator*). Winter.

Great Crested Grebe (*Podiceps cristatus*). Permanent. I am inclined to believe that neither the male nor the female attain their adult plumage until the spring of the third year.

Little Grebe (*P. minor*). Permanent.

Cormorant (*Carbo cormoranus*). Occasional. Sometimes killed many miles inland.

Blackheaded Gull (*Larus ridibundus*). Permanent.

Common Gull (*L. canus*). Winter.

HENRY L. SAXBY.

Balta Sound, Shetland,
May 26, 1861.

*Notes from the Journal of a Naturalist in Sweden.**

I NEVER recollect a worse season for sporting. The foxes appeared to have killed all our hares in the deep snow. The partridges in our neighbourhood have been swept off to a bird by the long and severe winter of 1859; and I reckon that two out of every three clutches of capercally and black grouse were destroyed by the rainy summer. All the snipe-grounds were deluged; and, except a little duck-shooting, our season was a blank, and the high, muddy state of the water spoiled nearly all the fishing.

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* Reprinted from the 'Field' Newspaper of June 22. The writer is Mr. Wheelwright, now residing at Gardsjo in Sweden, and well known by a most interesting work on Australian Natural History.

Luckily, however, let the season be what it may, it can never be an entire blank to the naturalist. If it does not suit one bird it is sure to suit another; and I have noticed one thing in collecting in the North, that every season is richer in some certain birds than another; in some years we never get an egg of many of our rarer birds, whereas in others we find them perhaps as easily as the commoner species.

As soon as the woodcocks and fieldfares leave us we always know that winter is at hand; and the arrival into the midland districts of the first flocks of waxwing chatterers, which migrate in thousands from their northern breeding haunts in autumn, passing over the country like a swarm of locusts, clearing off all the mountain-ash berries on their road, is a certain forerunner of the first snowstorm. Last year was a bad one for rowan berries, and we had but few waxwings. On November 23rd I saw, however, the first flock; and, true to their natural instinct, they heralded the first deep fall of snow, although the heavy fall did not come till the second week in December, and perhaps the deepest fall was about March 22nd, when it snowed for thirty-six hours without intermission. The weather throughout the early winter was clear and cold, and we managed to get about the forests pretty well till the end of January. The river was open till December, up to which time a few ducks (I fancy the young goldeneye) remained with us; and I also saw odd flocks of redwing, and occasionally a sparrowhawk, although all the regular summer migrants had long left us. The sledging was good throughout the winter, but the ice on the lakes was bad, and in many places, except just in the intense frost, dangerous.

The steamers were running to Carlstadt and even to Stockholm till the third week in November, and the communication was again open in the spring by the second week in April.

Although the weather throughout April has been delightful, the spring is backward. At the time I write (April 30th) very little ploughing has been done with us; scarcely a bushel of oats sown, and not a tree is in leaf. We may, however, soon expect a change (and "time enough," I fancy the English reader will exclaim), for our last winter seemed to come on the 25th inst., when we had twelve hours' snow and 5° cold at night. With all due fear of 'Punch' before my eyes (who has immortalized your old lady correspondent for prophecying a warm and early summer from seeing a wasp on the 11th of February), I prognosticate a finer summer and autumn in 1861 than we have seen for some years; although even now I fancy we have more snow in our northern sky, and shall yet have a few more severe night-frosts, for our spring migrants are certainly late; nor till I see the first yellow wagtail, or hear the glad note of the ortolan bunting, shall I believe that the winter is over.

The following list will give a pretty correct statement of the time of the arrival of such of our summer migrants as are already here:—

Feb. 10. Saw the first jackdaw, and a small flock of crows. Some few stragglers, however, had remained with us throughout the winter.

March 18. Saw male goldeneyes on the river. The females did not appear to come till a fortnight after.

About March 22. Saw the first buzzard, and a starling. The lark had been here a fortnight.

On the 25th the golden plover and chaffinches had come.

March 28. Saw the first kite, the first white wagtail, and heard a robin singing in the evening. Saw a large bat (I fancy the Vespertilio discolor) hawking about in the twilight.

About the second week in April the fieldfares, redwings and bramblings came back, many redpoles and siskins, and (except the green sandpiper, the stock dove, the woodcock, the common snipe, and the cranes, all of which have been with us for about a fortnight) these are nearly all the spring migrants that I have as yet seen. I have this evening seen the first troop of wild geese (I fancy Brent) pass over northwards, and this is a good sign that the season in Lapland will soon commence, although probably the steamers will not get up the Bothnia till the middle of May; but another fortnight will bring many additions to our northern fauna.

We have had a great many woodpeckers in our forests this year, and more of the three-toed and gray-headed woodpeckers than I can ever remember. Neither of these, however, breed with us. I observed in the severe weather that the woodpeckers here get much into the holes of trees for shelter, and I also observed that the gray-headed woodpecker much frequents the gable ends of wooden houses and buildings, and is by no means shy. I took the first nest of the great black woodpecker on the 16th of April, with five eggs. All the birds that breed in holes of trees go to nest early. I got two full nests (six eggs) of the Strix Tengmalmi the second week of April, and about the same time a nest of the brown owl and stockdove (very early for us). I got the first nest of the crested tit on April 20; and the little Parus borealis and middle spotted woodpecker are just now going to nest. I have already seen one wild duck's nest with nine eggs, and have taken two nests of the common buzzard, which with us appears to breed earlier than any of the hawks. I know of a nest of the siskin just finished, and I have no doubt the missel thrush has long since laid. I took my first parrot crossbill's nest, with eggs, on March 6th, and the last on April 16th. But, at the risk of tiring your patience, I must now say a few words on the breeding habits of these rare and interesting birds, more especially as the correctness of my remarks on this subject, published in the 'Field' last autumn, being so directly at variance with all that has yet been written by the naturalists here, has been much doubted. I felt, therefore, not a little anxious to see whether the observations of a fourth season would corroborate those of the three previous ones, and I was determined not to leave a stone unturned. We had a great many parrot crossbills with us in the early winter, and I anxiously watched to see if they would remain here to breed. I hired a man (upon whom I could well depend) to watch the birds throughout the whole winter, with strict injunction to him not to shoot one, but to report progress to me every week on their habits. The consequence was that I have been most amply repaid, and have had the good luck to obtain twelve full nests of the parrot crossbill and eggs, one with the young in the downy state, and one with them just flyers. This has been most satisfactory, for what I have seen this spring has completely corroborated my previous remarks, and proved my statement to be correct to the letter, *viz.*, that the breeding season of the crossbill is as well fixed as that of any other bird, and ends about the middle of April (probably varying a week or ten days, but I do not fancy much more, with the season), and does not, as stated by all the writers on the Swedish fauna, extend over a period from the middle of winter to midsummer; moreover, that the nest is never domed, as has been represented by our naturalists, but invariably, according to my observation (and I have seen nearly 100 nests of both species), open and rather shallow, with thick walls built exactly as I have stated in my previous remarks.

Strange to say, not a single pair of common crossbills bred with us this year. I only saw one flock, and that was early in March; but they passed over south, and I fancy that they are not so hardy as the parrot crossbill, and in severe winters go further south to breed. As I was determined to be correct this year, in every instance when I took the nest I shot one or both old birds, and well I did so, for there is so little difference, I now find, in size between the eggs of the common and parrot crossbill (except in the *very* old birds, who rarely lay more than three eggs), that the size alone can never be relied upon as a certain mark of distinction. In the winter and spring of 1859 and 1860, I did not obtain a single nest of either, for the snow lay too deep in our forests to get about; but that some bred with us at their usual time, even in that severe weather, was proved by the fact that in the end of June I shot two young parrot crossbills, which had probably left the nest two months. We had no very great supply of fir cones this winter, but plenty of fruit on the pines, and on these cones I fancy the parrot crossbill almost exclusively feeds. At any rate, although I have occasionally seen them on the fir trees, I can always feel certain, if I see any crossbills on a pine, they are parrot crossbills. After the 16th of April I have not got a single nest, although I have been seeking with double vigilance, to prove, if possible, that they breed later on. Curious that I found a new nest just completed about that time, which, however, the birds deserted without laying in. Could instinct have told them that the season was over, and that all their comrades had finished their tasks? I fancy the families keep together till the autumn, when they pack; but they do not always remain throughout the summer in the district where they breed. The common crossbill seems to go to nest a little earlier than the other.

It is not to be wondered at that so little is known of the breeding habits of a bird so rare and local as the parrot crossbill. It is not every one who cares to watch the forest when the snow lies a foot or two on the ground, and fewer still who can be depended upon as to the identity of the bird if they find a chance nest.

We began to catch the burbolt under the ice about the 5th of January, and the spawning season appeared to last till the middle of February; but the season has been a bad one. I ate the first smelt in Carlstadt in the first week of April: they were the finest I ever saw. I measured one about a foot in length, and we are just now beginning the pike season. In a letter from that veteran sportsman Mr. Lloyd, of the 12th of April, from Wenersborg, he says:—"Yesterday I was out with my rod, and killed a brace of trout, weighing together 30lbs.; but the day was desperately cold and windy, or I should probably have done better."

I don't know what your fox-hunting friends will think of us when they read the following passage:—Never were so many foxes shot in our neighbourhood as during the last winter; and although we have had a wolf or two sneaking about our forests, I did not hear of one being shot. I only got one specimen of the pine marten, and only on one occasion did I see "spor" of the lynx; but, I am glad to say, the elk is gradually more and more spreading over our forests.

The woodcocks this year appeared to remain only a short time on the coast when they landed, but hurried up to their breeding haunts in the interior. A friend of mine, a keen sportsman, writes me word from Gothenburg that never in any previous spring were so few cocks killed there as in this. He only bagged four couple, instead of eighteen to twenty couple—his usual number every spring. They began to "road" with us about the second week in April; but when they first come up they seem to fly about most in the mornings, just at gray dawn. Now, however, they "road" regularly every evening, and in a good stand I can always reckon on five or six shots any night. I can't make out exactly what this "roading" is. I used to fancy it was the birds flying backwards and forwards over the forests to their feeding grounds; but now I fancy it is a kind of love-chase, at least in spring, for I observe that now they always fly in pairs after each other, toying in the air, uttering their peculiar call-note, "Korp, korp, kisseck, kisseck," and pass backwards and forwards over the same spot every ten minutes. It is a pity to shoot them now, and perhaps even more so later on in the season, when they have the young birds to provide for. Did any of your readers ever remark that a cock will sometimes drop when you fire at it, even if not touched with the shot? I have; and once, when I was loading, a cock passed very low over my head; I flung up my cap at it, and it fell as if shot.

Most of us who are at all accustomed to wander much in the forests are familiar with the prolonged mewing cry of the buzzard, and I fancied this call-note was peculiar to that bird; but one morning early in April I heard the same mewing cry from a tree in our garden, and upon creeping cautiously up, to my great surprise I found it was uttered by a jay. I have since remarked the same call, which has much deceived me, so exactly resembling the note of the buzzard, for never before did I hear the jay utter any other note than its usual discordant screech; I fancy this must have been the love-call.

Up to this it has been a very bad season for capercally, at least for the poachers who shoot them in the spring. They have displayed very badly in the mornings, I fancy, owing to the frosts, and I have not heard of more than about four being killed near us. This is lucky, and augurs well for the breed of the ensuing year, for it is not of so much consequence shooting the old cocks if they are only spared till May.

I had the pleasure one morning, while lying in a brush-hut on a moss, watching the blackcock at play, to see a specimen of that rare bird the Tetrao medius of Linneus, or rackelhanne. About a dozen blackcock were "coo-oo-ooing" and flirting round me, some on the ground, others in trees, when all at once I heard a loud hoarse note which I knew did not belong either to a blackcock or capercally, and presently a male rackelhanne flew down and speedily put the blackcocks to the rout. The hens, however, would not notice him, and he soon flew away, probably disgusted with their coyness. I watched him very anxiously for some time, but he never came within shot; and although I have set a good price on his head, no one has yet had the luck to kill him.

Of all the sandpipers the green sandpiper is my favourite, and comes back to us at least a fortnight earlier than any of the others. I love to see them as they dash round over the tops of the trees, making the whole forest re-echo with their wild "chee-wheet, chee-wheet." I shall this year watch their breeding habits very closely, and see if they ever do lay their eggs upon the ground like the rest of the tribe. I shall also watch very carefully to see if I can detect the same pair of birds of any species bringing up two broods of young in one season; and I trust any of your correspondents who are interested in the rural economy of birds will do the same. I am still of my old opinion, and shall not alter it without very strong grounds.

I shall perhaps have good opportunities of watching the habits of the viper this year, for our mosses swarm with them. I wish I might be lucky enough to throw some light upon the disputed question of their swallowing their young; I perfectly agree with Dr. Bree, that conclusive proof is still wanting, and till an old viper has been seen to swallow them, killed directly, and sent for dissection to some competent person, we are at perfect liberty to doubt a fact of so extraordinary a nature. It is a strange thing that in a country abounding, as this does, with vipers, no naturalist has noticed the fact, and upon my mentioning the dispute to one of our best field naturalists here, he declared he had never even heard of such a supposition.

I have had good and frequent opportunities this spring of noticing the song of the redwing: although a sweet pretty song, it has neither the vigour nor rich gush of melody of that of the common thrush; it is much varied, rising and falling in cadences with occasional runs, not unlike the common robin, but far more powerful. I fancy, however, it owes much of its beauty to the calm quiet which reigns over all at the time when it pours out its evening lay from the depths of the forest. As to the song of the fieldfare, it is very poor, and can hardly ever be distinguished among the chattering and clamour which always prevails when a lot of these lively birds get together.

Contrary to custom, this year I did not see the blackthroated divers till the ice had broken up, but I now observe that they, as well as the goosanders and goldeneyes, have paired, and are taking up their breeding quarters.

Collected Observations on Birds' Nests, &c.—Perhaps the following remarks on Mr. Newman's "Collected Observations on the Nests and Eggs of British Birds" may not be entirely out of place, as affording a little extra information to the young collector in certain localities:—

Peregrine Falcon. I have known of the occurrence of three nests within a range of fifteen miles of Carlisle, *viz.*, one near Gilsland Spa, a second near Talking, about eight miles south of the last-named place, and a third on the banks of the River Eden, opposite Nunnery. This last nest I discovered by watching the female. It was placed on a ledge of a perpendicular rock about two hundred feet high, nearly midway between top and bottom, and quite inaccessible without the aid of ropes. The late Mr. T. C. Heysham got the eggs from the first nest, and I stuffed the old female that was shot off the second nest.

Kestrel. Breeds entirely in woods in this part of the country, there being no suitable rocks. In Cumberland they choose either woods or rocks, in the latter situations frequently among jackdaws.

Tawny Owl. I knew of one nest in a hollow tree; the nest was about a foot from the ground, the entrance being about two feet higher. I found another nest in a cavity formed by the decayed root of a tree that had grown in the cleft of a rock, about twelve feet from its base. As far as I can recollect there was little if any nest in either of these cases. I knew of a third nest close to the ground, at the foot of a young fir tree; this was a rude nest of the bird's own making.

Pied Flycatcher. Of this bird I have had much experience. They generally select a hollow tree where the entrance is small, but when this was enlarged, to get out the eggs, I generally made up the entrance with pieces of bark, and they would again build in the same tree. Sometimes the redstart would contend for the possession, and in one case, where I had seen a flycatcher building, on my next visit, about a week after, I found one flycatcher's egg and a dead female redstart in the nest. The flycatcher, however, did not always conquer, as I afterwards found. One day, while passing along a footpath close to the side of the River Eden, in Barnwood, my attention was attracted by the sharp chick of a pair of redstarts and a male flycatcher; I looked for a hollow tree, but nothing of the kind was near, and on getting up to the stump of a felled tree about four yards up the bank I found, in a crack across the top where the wood had decayed, a female flycatcher sitting on her nest; she did not seem inclined to leave it, so I poked two fingers in below her, took out an egg, tried it in the river and found it to be nearly hatching; putting it carefully back I looked round for the redstarts, and found them behind some loosened bark in front of the stump; this I removed, as it faced the footpath and might lead to the discovery of both nests. On two visits afterwards I found the redstarts had got and kept possession of the flycatcher's nest, and had reared the young. The late T. C. Heysham was with me when we saw them nearly full fledged, and none but the redstarts were in attendance.

Dipper. Much sagacity is often displayed in selecting a place for its nest. I knew of one placed on a ledge of rock behind the shoot of a small cascade, on a little brook about four miles south of Carlisle. The fall was about twenty feet, but the water only detached itself from the rock about six feet from its base, where the stone had been hollowed out by the action of the water, where it pitched clean over, about a yard in front of the nest. I should never have thought of looking for a nest there, had I not seen the bird come out and fly up the River Petrill, which was within twenty yards of it. In another case, about half a mile higher up the same river, I had a long search for a dipper's nest. It was situate on a bank about six feet high, at a bend of the stream, the loose shale and rock which had been scooped out by the floods leaving an overhanging edge, held together by the roots of trees and bushes. I knew by the actions of the birds that the nest was confined to a space of a dozen yards, but I looked in vain under the overhanging bank and among the old tree roots; at last, when raising my head, I caught sight of the entrance hole in the face of the overhanging edge, and so nicely was it made to correspond with the rest of the surface, both as to colour and form, that I could not distinguish it, except by the aperture. I had passed it repeatedly within three inches of my nose, but as the upper part of the opening projects beyond the lower in the dipper's nest, it could only be seen when raising the head from a stooping position. There are frequent cases, however, in which the dipper attempts no concealment, but then, though it may be easily seen, it is not so easy to get at; in these cases a ledge of rock is selected that goes sheer down into deep water, and the nest cannot be approached from above or from either side, except with great difficulty. In such cases the old birds become very pert, flirting about and chattering quite close to the nest. One of these places used to be occupied year after year (and I have no doubt there is a nest there at this moment, for they build early), near Southwaite Station, on the Carlisle and Lancaster Railway.

Ring Ouzel. I found two nests one day; one on a ledge of rock at Fisherplace Cascade, a waterfall on a small brook coming down from the Helvellyn Range, a little south of St. John's Vale.

Twite. I find the nest upon a moss, within a few miles of Warrington, always close to the ground, but always shaded over with a small bush of ling.

Dotterel. Mr. Heysham's account as quoted cannot be taken as a guide by those who intend to look for the eggs, for nest there is none. The birds do not select the summits of the highest mountains, nor do they lay their eggs where the fringe moss grows, but in a depression upon short dense grass a little below the summit. Mr. Heysham only saw the place where I found the first eggs, I believe, on record. This was on Whiteside, a short distance from the end of Swirreledge, the ridge which connects Whiteside and Helvellyn. I found another nest afterwards on Robinson, a mountain near Buttermere; the place selected was precisely the same as the first one. On the same day I found a young one, apparently only a few days old; it rose up close to my feet, and ran before me, or I should never have seen it. I may mention that the habits of the dotterel are different from the other plovers that I am acquainted with, *viz.*, the golden and ringed plovers; these are somewhat noisy when you are near their nests, the dotterel goes off to a little distance and sits quite mute; one of the old birds belonging to the last nest I found sat motionless on a stone until I approached within a few yards of it: the parent of the young bird that I found was different; it flew round me at a great height, uttering at short intervals a plaintive note, something like the call-note of the common linnet (*Fringilla cannabinum*).—*James Cooper; Museum, Warrington, May* 17, 1861.

Iron Birds' Nests.—At a recent meeting of the Sheffield Literary and Philosophical Society Mr. Stirling Howard exhibited some horseshoe nails, as a sample of two gallons, by measure, of the materials which a number of pigeons had carried from a blacksmith's shop, and used to make their nests. The facts, as communicated by Mr. E. S. Howard, of Woodside, to the 'Sheffield Daily Telegraph,' are briefly these:—"Over one end of the blacksmith's shop is a rude loft, in which are a number of boxes, the domiciles of the pigeons. The nails, which were taken from canvas bags and other receptacles, are of the ordinary horseshoe kind, of various sizes, some new, others old and crooked. They were, however, laid with some regard to comfort, inasmuch as the points were not allowed to project upwards, but without the admixture of softer materials. This is the more singular, as there is abundance of straw, shavings, &c., in the neighbourhood. On these 'iron beds' the birds had laid their eggs, which were just ready for hatching when the discovery was made of the use to which the nails were applied. The nails when removed filled a watering-can holding about two gallons, one of the nests containing more than a stone weight. The eggs were destroyed. The pigeons are of the ordinary kind, but some of them have a cross between the 'carriers.'"

Collected Observations on Bird's Nests, &c.—I have been much interested in Mr. Newman's "Collected Observations on the Nests and Eggs of British Birds," and as he states he would be glad of information on the subject, I make free to notice a few points wherein my observations lead to rather different results, leaving the readers of the 'Zoologist' to put such value on my remarks as they may think proper.

Dartford Warbler. The eggs possess, I think, a distinct character, quite separating them from those of the whitethroat, lesser whitethroat and reed warbler, all of which they are sometimes said to resemble. The white ground colour and the distinct markings (or nearly so) sufficiently distinguish them; they never, so far as I have observed, possess the greenish ground met with in the other species. I had some twenty nests through my hands last summer, and found this characteristic pervading all of them. These birds were very plentiful for two years, but last winter has I fear destroyed the greater part of them. I never found more than four eggs in a nest.

Goldencrested Regulus. I have two nests this season, one with eight eggs, the other ten.

Meadow Pipit. I took a nest the week before last with only four eggs, hard set, and have before had them with only four eggs.

Greenfinch. Six eggs are not uncommonly found.

Rook. I have nests of eggs taken this season, varying in number from three to six.

Heron. Pale greenish brown; should probably be pale greenish blue; at any rate the heron's and bittern's eggs can scarcely be called the same colour.

Common Snipe. I have the nest and four eggs, taken this season in Hampshire, and knew of a nest and four eggs being also taken there last year, so that the South as well as the North of England may be inserted as a locality.

Common Shieldrake. Breeds regularly and commonly on the coast of Caermarthenshire, South Wales. I have the eggs which I know to have been brought from there, and am expecting more this season.

Wild Duck. I had the eggs last year from a nest placed in a furze bush, in a moorland district in Hampshire, on the top of some very high rising ground, about a mile distant from any water.

Teal. Often breeds in Hampshire. I had the eggs from there last year; a nest of eight, found in an open heath, some distance from water.

Merganser and Goosander. All my mergansers have a greenish or a brownish hue, and have all a much more delicate glossy polished appearance in the shell than the goosander, which are of a coarser texture and strictly cream-coloured. "Equally blunt at both ends," however, does not apply as a marked characteristic.

Shag. I have seen eggs of this species, obtained by a friend of mine from the South of England, from a locality where the cormorant is comparatively rare.

Sparrowhawk. Out of a large series I have I find the markings are very nearly as often at the small end as at the large. I have lately received a nest of five, the most beautiful I ever saw, about one-half of the surface marked as dark as a kestrel's egg, in two of the eggs at the large end, and in three at the small end.

Redbacked Shrike. I have a long series of these, and find the greenish white colour more common than the pinkish white, the spots often forming a very decided zone.

Sedge Warbler. I have taken many nests, to a great extent lined with wool or feathers. The nests this season are composed almost entirely of sheep's wool (a flock occupying a field in the immediate vicinity).

Nightingale. I believe much more often suspended in a bramble, &c., near the ground than actually on the ground.

Blackcap. I have some nests quite correctly made, by no means "slovenly in structure," though of course to some extent retaining that character. Most, I believe all, I have seen are well lined with horsehair; I have one, the outer structure of which is almost entirely sheep's wool.

Marsh Tit. I have a beautiful nest taken this season out of an old hollow gate-post, a very solid closely compacted nest of moss, hair and wool, well mixed and connected together. There is, moreover, just enough rabbit's fur to confirm Mr. Newman's remark as to its usual presence where procurable.

Kestrel. I have a nest of five this season, four as usual, the fifth somewhat larger and pure white.—*Alfred Crowley; Croydon, May* 20, 1861.

Preservation of our Little Birds.—In the 'Times' of the 17th of May, the editor, in referring to the measures taken by Sully, in the reign of Henri Quatre, to preserve fish in the rivers of France, remarks, "Little fish were almost as scarce in France as little birds are now." Having passed many years of my life on that part of the Continent I can corroborate the statement with respect to the paucity of little birds, particularly songsters. Thinking that the "little fish" are now in good keeping, and may be safely left to the fostering care of Her Majesty's Commissioners, I would appeal through the pages of the 'Zoologist' (the only channel open to me) to country gentlemen, and ladies too, to use their best endeavours, before it be too late, to check, if they cannot prevent, the indiscriminate slaughter of our "little birds," or, possibly, after the lapse of two centuries more, an editor of a New Zealand 'Times' may have it to record that "little fish were almost as scarce in Britain as little birds are now." I have long deplored the destruction of our little birds (the large ones take care of themselves) even by the ornithologist, thinking, with others, that the telescope might frequently be substituted for the gun. The immediate cause of my taking up my pen is that I have recently heard from a friend that a gentleman's gardener in this neighbourhood boasts of having, during the last season, shot six hundred little birds, among which, doubtless, were many of our rarer songsters, and the beautiful bullfinch too, a specially persecuted species by gardeners, on account of the injury, real or imaginary, it does to the budding fruit trees. It is also preyed on by birdcatchers, both professsional and unprofessional, and though many of the females may be spared, still, as it is not a polygamous race, there is reason to fear that it will ere long become scarce, if not extinct. Formerly they made me periodical visits, feeding on the privet berries, but of late years none have appeared. During the late severe winter hundreds of thrushes must have been shot by idle men and boys, but for that the country ladies and gentlemen are not responsible. But I would suggest to all those who have a taste for strawberries, and not for music, that they forthwith supply their gardeners with nets, which are now procurable at moderate rates; besides this would obviate the necessity for powder and shot. To those who are lovers of birds more than of fruit no appeal is needed; they will never grudge so small a portion of the produce of the garden or orchard in return for the cheering song, or in consideration of the services rendered by most species in destroying the innumerable insects that infest our gardens during the summer months. Having called attention to this deplorable case, I trust the editor will take the matter up, and stigmatize such heartless and selfish acts as they deserve. I say selfish, for the parties concerned should reflect that they are depriving their neighbours of what they may value more than the choicest fruit. A market gardener might perhaps be excused, as there would be extenuating circumstances to plead, but for the gentleman there are none. It is fearful even to contemplate—if this be a fair average of birds destroyed on most properties—what the grand total would amount to could returns be obtained of birds killed by gardeners every summer in the United Kingdom.—*Henry Hadfield; Ventnor, Isle of Wight, May* 20, 1861.

Extraordinary Assemblage of Birds.—A most extraordinary disturbance among the feathered tribes occurred at Start Lighthouse a few nights since. Between ten and eleven o'clock the man on duty was surprised at discovering that a great number of birds kept flying against the lantern of the building. On going out he found, to use his own words, that they were like a swarm of bees, flying around and against the glass of the lantern, and dropping either dead or much exhausted. The wind at the time was blowing hard from the north-east with rain; after some time it became much calmer, the birds continuing to fly against the lantern, and increasing in numbers as it became more calm, until finally they reached the immense number of six hundred and ninety-two, which he picked up dead. He had the curiosity to weigh them, and their weight amounted to about 34 lbs. They consisted chiefly of sky larks, house sparrows, and several varieties of the smaller kinds of birds, amongst which was a cuckoo. This disturbance seems unaccountable: it evidently could not be any migratory flock, for then they would have been all of one species, whereas there were of several, and such a circumstance has never, we believe, happened before.—*Kindly communicated by Charles Prideaux, Esq., F.L.S.*

Arrival of Summer Birds at Blackheath.—The long frost and snow, the severe winter and the cold spring, have delayed the arrival of the summer birds of passage. The nightingale was heard in Shooter's Hill Wood on the 11th of April. April 17th, saw a redstart; 19th, a whitethroat; 22nd, one swallow flying due west, high over Shooter's Hill, one willow wren, two whitethroats; 26th, one swallow, one nightingale, willow wrens, whitethroats, redstarts; 28th, one swallow at Chiselhurst, and one swallow by the round pond in Blackheath Park; 29th, three swallows were hawking on the heath; 30th, saw two swallows at Eltham moat, one swallow on the pond at Kidbrooke farm, one whinchat springing up catching gnats, one tree pipit. May 2nd, I saw a pair of willow wrens building, and mighty fussy and important they were about it: looking through my telescope along a path I saw a nightingale and a robin feeding together, and plucky little robin kept pecking and driving the aristocratic nightingale away; 9th, one swallow, one whitethroat, one whinchat; 12th, I met a pair of house martins in Lee Lane, and saw a pair building at Eltham, and four were hawking over the new houses in the Dover Road; swallows located; 15th, I was delighted to see two swifts at Eltham; 18th, I saw one butcher bird, one flycatcher; swifts, swallows, and house martins were disporting over Eltham; 19th, I counted at once ten swifts careering over and chasing each other round the ancient church of Eltham, their birthplace for hundreds of generations. The swift is emblematic of life, liberty and velocity. The early swallows could not stay at home for want of food. I generally first meet with them on the old ponds. The season has been too cold to develope sufficient insect life; I have seen none stay over water. I have walked many miles along the hedges of the roads and fields, scarcely meeting with a bird. The whitethroats alone are plentiful; I find them creeping about the nettles at the bottom of a warm thick thorn hedge, picking up the little black ground spiders and the red ants. I have not seen a blackcap, a chiffchaff or lesser whitethroat; I suppose I miss them through deafness. A source of unalloyed enjoyment, the sweet melody of the nightingale, the blackcap, the garden warbler and the woodlark, is lost to me. I can see a bird singing away joyously, and cannot hear a note. I can only just catch the last piercing note of scolding jenny wren. The house martins came with the warmth on Sunday, the 12th of May; there was a strong S.W. upper current of clouds, while the under current was N.E. I send my notes of the birds I saw to show how late and slowly they have arrived: they are three weeks late. The swift is ten days behind his time. Vegetation this season appears to be three weeks backward.—*Matthew Hutchinson; Blackheath, May* 20, 1861.

Occurrence of the Osprey near Winlaton.—On the 19th of last May a beautiful osprey was caught in a wood near this place. It must have been wounded some little time ago, as it was in miserable condition, though its plumage was splendid. I have heard of them being seen at Tynemouth, which is about fourteen miles from here, but this is the first I ever heard of in this neighbourhood. It had got entangled in a bramble bush, and was unable to rise. It is in the possession of Mr. Edward Hutchinson.—*Thomas Thompson; Winlaton, May* 22, 1861.

Occurrence of the Osprey, &c., at Swatow.—Through the kindness of Mr. Caine, H.M. Consul at Swatow, I am able to record the acquisition of another osprey (*Pandion leucocephalus* of Gould, *P. haliaëtus orientalis* of Temminck). The specimen received in the flesh from Swatow is a male, and as I before had the pleasure of noting a female of this somewhat rare bird from Amoy in the pages of the 'Zoologist,' a few remarks on this male will also probably find acceptable place. Length 20 inches. Wing, 18. Tail, $7\frac{2}{10}$. Length of bill, $1\frac{4}{10}$; height, $\frac{8}{10}$. Tarsi, $2\frac{1}{10}$. Outer toe, $1\frac{1}{2}$; its claw, $1\frac{1}{10}$. Mid toe, $1\frac{8}{10}$; its claw, $1\frac{1}{10}$. Inner toe, $1\frac{2}{10}$; its claw, $1\frac{2}{10}$. Hind toe, $1\frac{2}{10}$; its claw, $1\frac{1}{10}$. Wing stretching $2\frac{1}{2}$ inches beyond the tail. The bill is measured from the gape horizontally, and the claws in their diameter. Bill grayish black, grayish blue on the basal edge of upper mandible and the basal third of lower. Lore dark grayish blue. Cere the same, tinged with yellow. Legs pale flesh-blue, bluer towards the claws, which are black; soles brownish. Inside of mouth light cobalt-gray, with more or less flesh-colour. Œsophagus about $\frac{7}{10}$ wide, distended at the proventriculus to about an inch or over, this with the stomach assuming the shape of a somewhat flattened pear, and the whole in length $3\frac{2}{10}$, widest part 2 inches. The coat of stomach thin and smooth, both inside and outside, with no visible muscles. Contents, remains of large fish. Intestines very long and thin, and varying from $\frac{2}{10}$ to $\frac{3}{10}$ in thickness; $\frac{4}{10}$ at the rectum. Cœca situate $3\frac{1}{2}$ from the anus, ovate and adnate, white, and about $\frac{4}{10}$ long. Testicles white, round and soft, about $\frac{1}{4}$ long. I have also to record from Swatow the first bittern I have as yet seen from China, though it is natural to suppose, from its general distribution throughout Asia, that it must be common in some parts of this empire. This bird answers perfectly to the description of Botaurus stellaris in Macgillivray, but is somewhat smaller, as will be seen by the following measurements. Length, $27\frac{1}{2}$ inches. Wing, 12. Tail $4\frac{2}{10}$. Bill along culmen, $2\frac{6}{10}$; along the edge of under mandibles, $3\frac{1}{2}$. Tarsi, $3\frac{6}{10}$. Hind toe, $1\frac{3}{10}$; its claw, $1\frac{2}{10}$. Outer toe, $2\frac{3}{10}$; its claw, $\frac{9}{10}$. Middle toe, $3\frac{1}{2}$; its claw, 1. Inner toe, $2\frac{6}{10}$; its claw, 1. A phalarope has also frequently been shot at Swatow. One man told me he shot no less than twenty of these birds out of a very large flock. One could not well be mistaken in the bird, from its conspicuously lobed feet. I have not been successful in procuring specimens, and cannot therefore refer it to any of the known species. Nearly every winter I am told these birds occur at Swatow, and are sometimes even found as late as April. The Chinese tell a wonderful story about their incubating their eggs under their wings while sitting on the water. I myself saw some years ago, about mid Formosa Channel, a flock of little sandpiper-like birds settling on the surface of a smooth sea: these I took to be phalaropes, but they might have been Tringæ, as I have known the latter to both swim and dive expertly when wounded; moreover from later accounts we learn that many land birds settle to rest on the water during their migration.—*Robert Swinhoe; British Consulate, Amoy, April* 5, 1861.

Blackbird with White Head and Neck.—The other day a fine cock blackbird was shot in this neighbourhood. The bill was bright orange as usual; the head and neck of a snow-white; some of the feathers on the breast are of a dark mahogany colour, and there is a little white about the wings; it is being preserved for a gentleman whose gamekeeper shot it, and is a very pretty specimen.—*Philip Crowley, Alton, April* 22, 1861.

Number of Eggs of the Dipper.—Mr. John P. Thomasson (Zool. 7544), commenting on Mr. Newman's article upon Birds' Eggs, says that he has more frequently found four eggs in the nest of the dipper than five (the number stated by Mr. Newman); and he adds that in one instance he found a nest with only three young birds. My own experience goes to reconcile the apparent discrepancy between the two statements. I have never found less than five eggs in nests built in the month of March; later in the season I have usually found four, especially when I knew the eggs first laid to have been taken; and on one occasion, when, contrary to my instructions, the second laying of four eggs were also taken, I have known the bird to lay a third time, and on that occasion she only laid three eggs. I know also, positively, that the dipper, even when not disturbed or robbed, will rear two broods in the season, and that the second brood is usually smaller than the first.—*R. Harvey; Leck Glebe, Co. Donegal.*

The Reed Warbler near Hull.—As I see in my edition of Yarrell that it is said the reed warbler has not been observed beyond Lincolnshire, I venture, at the risk of a repetition, to record its occurrence in this immediate vicinity. In an old brick-field, covered with reeds, I found it last week in some abundance, discovering four nests on a cursory examination, each with eggs quite fresh. I also shot several specimens of the bird. In the same locality Crex porzana was observed last year, but I was not successful in finding it, owing probably to the density of the reeds and the bird's shy habits.—*N. F. Dobrée ; Hull, July* 20, 1861.

Mr. Saxby's unknown Warbler.— Mr. Saxby, in his 'Notes on the Birds of Belgium,' mentions (Zool. 7543) having met with a species of Sylvia previously unknown to him, and being still in doubt as to its proper name, expresses a hope that some reader of the 'Zoologist' might be able to set that doubt at rest. May I be allowed to suggest that, judging from his description, the bird in question is most probably the Sylvia hippolais (melodious willow warbler) of the British, and S. hippolais and S. polyglotta of continental writers,— a bird well known on the Continent, and fully described in Yarrell's 'Second Supplement,' from a specimen killed near Dover in 1848. Mr. Bree, in his 'Birds of Europe' (now publishing), describes a warbler as distinct from the melodious warbler, but so nearly resembling it in size, colour and habits, as to have been often confounded with it by authors: it is called Viellot's willow warbler (*Sylvia icterina*), and said to be common in Belgium, especially about Liege and Brabant, occupying damp groves and willow plantations, also dry hills planted with vines and fruit trees; it also builds in gardens. Mr. Saxby will observe, on examination, that the wings of these birds are much shorter, in proportion, than those of the wood wren, and that the whole under plumage is light yellow.—*John Gatcombe ; Wyndham Place, Plymouth, June* 24, 1861.

Habits of the Shell Parrot (Euphemia undulata) *of South Australia, as a Cage Bird.*—It is now a good many years since a pair of these truly elegant birds were kindly presented to me, having been just brought by their owner from the neighbourhood of Adelaide, where they are said to be abundant in a wild state, although not widely distributed. Though more frequently to be met with in this country than was then the case, they are still valuable, and at that time were only to be purchased at a very high price. Of course I was anxious to treat such treasures as they deserved, and especially to accommodate them in a manner that should induce them to set about the business of a nest, or rather of rearing a family, for nest, in the usual meaning of the word, they do not attempt. According to the information respecting their habits which I received from their kind donor, I had a curved wooden tube constructed to resemble the hollow branch of a tree, leading into a box at the bottom, and after covering all with bark and lichen, that it might look rather picturesque than disfiguring, it was fixed in a good canary's breeding cage, the lid of the little nest-box being made to lift up, so that I might occasionally see what was taking place within. The birds, however, though to all appearance perfectly healthy, as well as affectionately playful, feeding each other, and dressing one another's plumage in the amusing way common to their tribe, never took any further notice of the carefully constructed cradle than to sit side by side on the top of it. This continued for a year or two, when the hen suddenly died, I believe in a fit. My friend generously sent me another in her place, greatly to the delight of the poor widower, who had been very restless and unhappy when first left alone, coming close to me when I approached the cage with what seemed a plaintive cry of enquiry as to what I had done with his mate, whose lifeless remains he had seen me take away. When the new companion was introduced it was very soon apparent that the artificial branch had become an object of attention, especially to the hen, who was often to be seen cautiously examining the aperture at top, venturing a little way in, and coming back as if frightened, then further and further by slow degrees, till at last she was heard most busily engaged in the box below. This was furnished with a bed of sawdust, to serve the purpose of the rotten wood and chips, which I had understood formed a resting-place for the eggs and young in a state of nature. Here, however, was displayed the difference between reason and instinct, for, instead of making use of what was provided, nothing would satisfy the bird but going through the process of biting, tearing and scratching the wood, as much as if it had been ever so necessary in some tree she had found for herself. At length, by dint of her efforts, she tore a hole through the bottom of the box, letting all the sawdust run out. To remedy this a stout piece of leather was nailed on, and the sawdust replaced. After several weeks' frequent running up and down, sometimes remaining so long below that I looked (in vain) for some result, I one day, on raising the lid, was gratified with the sight of a little white egg, about the size of a canary's, but rounder. The hen began immediately to sit. In three days there was another egg, and so on until five were laid. She sat for three weeks, the cock not sharing the labour with her, but industriously feeding her all the while, either in the box or when she came out on the perch. I do not think she ever once during the time went to the seed-glass or the fountain. She frequently, however, left the eggs for a minute or two, running fast backwards and forwards on the perch, as if to get all the exercise possible in so short a space, and then dived rapidly down the tube to her charge. Exactly at the end of the three weeks, a faint piping noise was heard from within the box, and much delighted were all who heard it to find a little, struggling, unclad bird, the reward of so much care and industry. Then came expectations of rearing a brood, teaching them to talk by early training, giving some to one's friends, and so on. But, alas! for only two days was the infantile parrot note to be heard; it grew less frequent by degrees, and then it ceased, the poor little bird was dead—a great disappointment. The mother, all the while it lived, was making a strange noise and bustle; and whether or not from the failure of that instinct she would have possessed if at liberty, it really seemed as if she did not know how to treat her offspring. Had she intended to kill it, a single stroke of her powerful beak would have been sufficient. The proper food was supplied, the usual canary and millet seed, with abundance of groundsel, which at this time the parents eagerly devoured, though when not so engaged they would take no green food, except a bunch of seedy or flowering grass, always their greatest luxury. The remaining eggs were not hatched, though all but one contained young birds in different stages of growth. After this six eggs were laid and sat upon, and one hatched in rather less time than before; the young parrot lived only one day, and three others shared its fate. The bird continued laying at times, but did not again sit regularly, and at last had a strange fancy for eating her own eggs. This pair lived after I had them, I think seven or eight years, when the cock died, apparently from old age, and the hen soon afterwards of asthma. I have since had another pair, the female of which was evidently very old when they came into my possession; the pretty yellow head had become spotted with green, and the bill and claws extremely long; after a short time the mandibles grew so much as to cross each other, just in the manner of the crossbill. It appeared to me that she was then unable to feed herself, or at least to shell the the canary seed. The cock, however, fed her frequently while she lived, but in two or three months, becoming quite infirm and decrepid, she died. Her faithful companion still survives, and must have been a great deal the younger bird. He is very much tamer in his solitude than before, though now quite reconciled to his lot, merry and noisy, as well as having his lovely plumage still in its beauty. Perhaps for want of any society of his kind, this bird plays with the finger held to him exactly in the same manner as with the bill of a companion, caressing it gently, singing to it eagerly, and even endeavouring to show his good will by bestowing the seed he has shelled and swallowed, just as is the constant practice of these loving creatures with each other. This attractive pet has been in his present home about four years. I understand in some rare cases others have been successful in the attempt to rear a brood of shell parrots.—*K; Sudbury, May* 14, 1861.

Occurrence of the Golden Oriole and White Stork in Norfolk. — A very beautiful specimen of the golden oriole, a male in full adult plumage, was picked up dead at Felbrigg, near Cromer, about the 17th of last month (May). This bird, which is in the possession of Mr. J. H. Gurney, exhibited no appearance of having been shot, but, although perfect in feathering, had, from some cause, almost wasted away. About the same time a fine old female stork was killed at Woodbastwich. Solitary birds of this species are not very uncommon in our marshes, but the present example is perhaps worthy of record, since, on being skinned for preservation, it was found to contain an egg apparently ready for immediate extrusion, but a little cracked on one side, caused, most probably, by the fall of the bird when shot. — *H. Stevenson; Norwich, June* 10, 1861.

The Golden Oriole at Scilly.—I am pretty sure, from information I received from Mr. Augustus Smith, on his recent visit to the islands, that the golden oriole has been off and on at the islands. I do not much like forwarding to you doubtful information for a record of Natural History, but in this case the reader will be able to form his own opinion when it is said that a bright yellow bird, with black wings and tail, about the size of a blackbird, was seen at Scilly.—*E. Hearle Rodd; Penzance, June* 20.

Occurrence of the Golden Oriole at Shalfleet. — A beautiful male specimen of the golden oriole has been shot at Shalfleet, about six miles from here. — *Henry Rogers; Freshwater, Isle of Wight.*

Occurrence of the Roller near the Land's End. — I examined, yesterday, a female adult specimen of the roller, killed last week, in the Land's End district. Mr. Michael Roberts, of this town, who set the bird up, told me that there were well-developed eggs in the ovary.—*Id.*

Titmouse Nesting in a Letter-box. — A curious circumstance in Natural History has occurred, or rather is occurring here. Mr. J. Turrill has, by my permission, a letter-box fastened to some palings by my back gate, which opens into the public road. Letters are removed twice a day, and in so doing one side of the box is let completely down. When, however, this door (or side) is closed, the only entrance is the ordinary aperture, measuring in this case three inches by seven-eighths of an inch. In this box a cole tit has built a most elaborate nest, and with such extravagance (chiefly, I believe, at the expense of my cows) that, not content with the nest itself, which forms a rearing and sleeping apartment which no feather bed or eider down could match, she has actually thickly lined or carpeted the remaining portion of the box, evidently as a *day* nursery. In this luxurious suite of apartments she is now bringing up a family of fourteen or sixteen (it is said); and so far from being frightened and disturbed by the visits of Her Majesty's deputy or the real owner of the apartment—whom they no doubt regard in the character of landlord, whose rent is to be paid inversely, in the matter of slugs, grubs, &c.—these unfledged interlopers are said positively to hiss like serpents at the entrance or exit of newspaper or letter. — *John T. Plummer ; May* 30, 1861.

Hoopoe in the Isle of Wight. — The hoopoe has been seen in several places in the island this year ; four have been killed and three more seen : three out of the four are in my possession ; they are very fine specimens. The ring ouzel has nested here again, close to my dwelling ; Mr. F. Bond has the nest and three eggs.—*H. Rogers ; Freshwater, Isle of Wight.*

Hoopoe killed on Plumstead Common. — On the 14th of May I had a very fine hoopoe brought me. It was shot on the morning of the 12th, on Plumstead Common, Kent. Upon dissection it proved to be a female ; some of the eggs were as large as No. 5 shot, and the stomach was full of the remains of beetles. The bird was very fat, and in splendid plumage.—*H. Whitely ;* 28, *Wellington Street, Woolwich.*

Kentish Plover killed in Devon.—On the 7th of May a female specimen of the Kentish Plover (*Charadrius cantianus*) was killed on the Plymouth Breakwater, by Mr. F. C. Kingston. On picking up the bird I immediately recognized the species by its black bill and legs. So far as I am aware this is the first recorded Devonshire specimen. Yarrell mentions one young bird being in the collection of Col. Montagu, now in the British Museum, but does not state from whence it was obtained.—*John Gatcombe ; Wyndham Place, Plymouth, May* 14, 1861.

Arrival of Summer Birds in the Neighbourhood of Plymouth.— March, 24th, wheatear ; 25th, chiffchaff. April 6th, sand martin ; 9th, willow wren ; 13th, swallow ; 17th, blackcap and redstart ; 20th, martin and puffin ; 22nd, tree pipit ; 25th, yellow wagtail and corncrake ; 26th, sedge warbler ; 27th whitethroat and nightjar ; 28th, whinchat ; 29th, common sandpiper ; 30th, wood wren. May 1st, grasshopper warbler ; 4th, swift and whimbrel ; 7th, Kentish plover ; 10th, greenshank ; 12th, spotted flycatcher.—*Id.*

The Eared Grebe killed at Doncaster.—About the middle of May I had sent me a splendid specimen of the eared grebe, shot at Misson, about nine miles from here, on low marshy ground.—*Hugh Reid ;* 8, *Spring Gardens, Doncaster, June* 12, 1861.

Brent Geese in April.—I saw some brent geese on the 22nd of this month on our river. One which was shot from our boat was in beautiful plumage. It is unusual for these geese to remain so far south thus late in the season.—*Murray A. Mathews ; Raleigh, near Barnstaple, April* 24, 1861.

Black Swans at large. — A pair of black swans flew down here to-day. It would be very interesting to know where they came from. If any of your readers have lost them I should be glad to be informed of it. My men tried to catch them, but were unsuccessful. I have thirteen black swans about my place, and I think that the pair alluded to must have been flying over and were attracted by them. My old pair, which I have now had about eight years, continue to breed about three times a year. They have hatched more than a hundred young ones, and have reared about sixty, Hardly any that they have lost died a natural death, but most of them have been killed by the old ones dragging them about when they were not strong, and the cygnets have got into holes from which they were unable to extricate themselves. No weather seems to affect them, as they breed equally well in the most intense cold of winter or the greatest heat of summer. Last winter it was necessary to break the ice round the nest for them every morning, as they were completely frozen in : the nest was a mass of ice and snow, and the young birds, which I now have, did not suffer in any way from it. Can any of the readers of the 'Zoologist' inform me of a similar instance of their breeding in this way? I may add that they had no shelter whatever.—*Samuel Gurney; Carshalton, July* 4, 1861.

Occurrence of the Northern Diver in June.—On the 15th of the present month (June), when at Seaton, on the coast of Devon, I killed a great northern diver. Unfortunately the bird was in moult, and had but partially completed its summer dress. The fact of this species remaining so late on our coast is, I think, worth recording.—*John Gatcombe; Plymouth, June* 24, 1861.

Occurrence and Breeding of the Lesser Tern (Sterna minuta) *at Spurn Point, Yorkshire.*—On a visit during the last week in May to Spurn Point, at the mouth of the Humber, we found the above graceful and not very common species breeding on the seaward side of the sandy neck of land that connects Spurn Lighthouse with the Yorkshire Coast. From forty to fifty pairs of these birds were hovering over a particular spot, and betraying by notes of alarm the presence of their nests. We discovered some half-dozen of the latter, all within the space of about five hundred yards along the shore, being apparently thus placed more from a love of company than any peculiarity in the spot selected. The nests were mere cavities scratched in the sandy and pebbly soil of the beach, and contained from one to three eggs, all fresh, proving, together with the limited number of nests, that the breeding season had but just commenced. The eggs were all deposited within a few yards of high water mark, and difficult to detect at first glance from their similarity to the rounded stones scattered about. We found several holes scratched out and ready for the reception of eggs, but whether abandoned from some cause or awaiting their complement of eggs was hard to tell. We were informed that these birds never breed on the Humber side of the neck, though the distance across is only about one hundred yards. The eggs correspond with those figured in Mr. Hewitson's work (second edition). It may be well to add that a specimen was shot to identify the species beyond doubt. In the same locality, and in several instances within a few yards of the nests of the above terns, the ring dotterel (*Charadrius hiaticula*) were breeding. In nearly all their nests the eggs were more or less incubated, in most instances considerably so, and in one case we were amused by the sight of a recently hatched bird running before us with the surprising velocity characteristic to this tribe, while the parent endeavoured to divert our attention in their well-known interesting manner. A few pairs of shieldrakes (*Anas Tadorna*) were also observed, said to be breeding on the holes of an adjacent rabbit warren.—*A. Dobrée, Hull.*

Kittiwake does not Breed in the Isle of Wight.—In reply to Mr. Hussey, concerning the kittiwake breeding in the Isle of Wight (Zool. 7547), I beg to give the result of my own observations during the seventeen years I have resided at Freshwater, during which time I have never missed visiting the cliffs in the breeding season, *viz.*, from May until autumn; and I assert, fearless of contradiction, that during that time the kittiwake has not bred here; nor do I believe that it has done so for the last forty years. I have made the closest inquiry of old inhabitants that I can depend upon, but not one of them can remember ever seeing the kittiwake in summer, except in very stormy weather. I shot a male in the breeding season of 1858, on a very stormy day; but this is the only specimen I have ever obtained in the summer. Although I collect the eggs of various birds from the cliffs every season, I have never obtained a kittiwake's; and men who have been in th habit of taking eggs from the cliffs for upwards of forty years do not know th [illegible] I know the lesser blackbacked gull bred here in 1857, but this is the only instance to my knowledge; in fact, the bird is a rarity with us, even in winter. The only gull that breeds regularly with us is the herring gull, which occurs here in countless numbers. I think, therefore, that when the late lamented Mr. Yarrell saw the kittiwake it must have been during or after a storm, and that he might have been told that it breeds here. In winter the following gulls are common with us: — large blackbacked gull, herring gull, kittiwake, common gull, blackheaded gull. — *Henry Rogers ; Freshwater, Isle of Wight, June* 17, 1861.

[I ought, in justice to the memory of so distinguished a naturalist as the author of the 'History of British Birds,' to say that I am informed by a friend that Mr. Yarrell was fully aware of the mistake he had made about the kittiwake, and intended to have corrected it: he was the last man in the world intentionally to repeat an error: everything he either wrote or said was marked by the most conscientious love of truth and accuracy.—*Edward Newman.*]

A Shower of Fish.—The following extract from a letter from Singapore, addressed to the Academy of Sciences, by M de Castelnau will be found interesting:—"We experienced a shock of earthquake here on the 16th of February last. It was followed by rain in torrents on the 20th, 21st and 22nd. When the sun came out again I saw a number of Malays and Chinese filling their baskets with the fish contained in the pools formed by the rain. They told me the fish had 'fallen from heaven,' and three days later, when the pools were all dried up, there were still many dead fish lying about. I found them to belong to the Clarias Batrachus, which can live a considerable time out of water, and even move to some distance on dry land. As they lay in my courtyard, which is surrounded by a wall, they could not have been brought in by the overflowing of a torrent, nor is there any considerable one in the neighbourhood. The space covered by these fish might be about fifty acres. They were very lively, and seemed to be in good health. I have particularly remarked the singular occurrence of the fish, having already, during my stay at the Cape of Good Hope, had occasion to mention to the Academy the fact of several new species of fish being found after an earthquake. Is it admissible to suppose that a waterspout, in passing over some large river of Sumatra, had drawn up the fish and carried them over? It is not without fear I venture to suggest this hypothesis."

An Eel found in a Stratum of Shells.—In sinking the present new pit of the Carron Company, at No. 10 engine, one of the workmen, Mr. James Kemp, found an eel imbedded amidst a strata or layer of shells, nearly eighteen feet from the surface, quite lively, but so emaciated that the eel more resembled the broad-bladed leaf of a water flag than a fish of the eel species. Upon being brought to the surface, the serpentine and slimy fellow began to swell and elongate, assuming the usual shape, and measuring about fifteen inches. How the muddy gentleman found his way into the shell bed is matter of conjecture both to naturalists and several intimate with Geology.—'*Falkirk Herald.*'

The Crab and its Allies. By C. SPENCE BATE, Esq., F.L.S., &c.

(Continued from p. 7553).

To be a faithful naturalist requires patience. When keeping a lot of young crabs together, we perceive, after a time, that one begins to thicken a little and the carapace to lift up, so that the posterior portion of the thorax becomes more conspicuous behind. This crab will also be found not to feed; in this way perhaps one, two or more days pass away. Watching the same one still, it will be found desirous to remove as far as possible from the neighbourhood of its companions, seeking a crevice for itself, appearing anxious and distressed if intruded upon by any stranger, becoming very savage, and darting at anything which approaches it; but if left at peace, it will quietly remain until the time arrives when it hitches the point of one of its claws in some crack or crevice, and withdraws itself from its old skin, escaping between the carapace and the body of the animal. To anchor itself by some crevice appears to be absolutely necessary; for a crab kept in a tumbler of water appeared to have no power to free itself from the skin until a shilling was thrown into the glass, when it immediately hitched its legs beneath its weight and drew itself out of the old skin. Immediately it is free it enlarges to the full size of its growth, at which it remains until it again throws off the shell.

Réaumur stated that the process is one of great labour and difficulty, as well as duration. But my own observation upon the marine Crustacea bear out those made by Messrs. Gosse and Couch, that it is easily and quietly done, in a short period, without a struggle; but they seem to have the power of choosing their own time of performing the act, and will not, if possible, do it while any one is looking at them. I have often watched and waited for hours, scarcely taking my eyes off the trough in which they were, without success; but upon my return, after an absence of only a few minutes' duration, I have found the exuviæ thrown off. Did I not say a naturalist requires patience?

It is an amusing story, an exciting game at hide-and-seek, to watch a crab. You run away a bit, but, fearing to stay too long and perhaps miss the whole, you just peep over the edge of the bason. No change; there sits the crab, with its eye upon you, come when you will; it only gives a jerk with its anterior antennæ, as much as to say, "Don't you wish you may get it!" So back you go again, and wait perhaps a little longer. Peep again; there its black eye is still shining at you, and seems to wink. A ripple crosses the surface of the water. Patience! I said you must have patience. Well, after a time you look again; the carapace is a little up, but the eye is watching still. "Ah! there you are again!" It seems to mock you, as the cautious creature crouches closer in its corner. After being tricked many times, continually looking and leaving, which will be found the most successful method of watching, you may see the process fully carried out. The carapace is first raised; then the legs and the branchiæ are drawn out of the integuments, as fingers from a glove; the tail is then withdrawn; and then the legs are raised up and pushed against the carapace, which is pushed forwards over the head. I took one during the process, and gradually, as it was raised, cut the carapace away with a pair of scissors: the animal performed the process as usual until it came to pushing it over its head, and here it entirely failed, because the carapace, the portion against which it pushed its legs, was gone. The skin by little and little was freed, until at last it hung only by the eyes, and in this horrid condition the poor thing kept running about, dragging the old skin with it, until its eyes were almost pulled out of its head. No one can imagine the distress but an old gentleman who, having taken off his coat, has hitched it to his spectacles and could not get free. In this state the poor crab remained, and probably would have remained until decomposition of the soft parts had broken the exuviæ to pieces, had not charity come to its relief and pulled the old skin away, an act which almost appeared to bring the eye-balls with it, so firmly was it held.

When the old skeleton is thrown the crab is soft, fleshy, and incapable of defending itself, and is therefore very liable to fall a prey to larger animals, both of its own and other kinds. The soldier crab, which lives in the shell of a mollusk, retires within its abode, and throws off first the anterior portion, which it tumbles out; and then, with its cheliform legs, pulls off the posterior, which is a thin, pellucid skin, and throws it outside also. Of danger it seems to be aware, and, probably under the excitement of fear, is much more active and less easily caught than at any other time.

This process is not repeated so often in the adult as in the growing crab. In the larva state it probably takes place every few days; as the animal grows older weeks intervene, then months, and lastly the moult is but once a year, and it is probable that when age creeps on the process is not repeated so often.

This last statement is inferred from the fact that crabs have been taken having on their backs a quantity of large and well-developed oysters, so large that the crab seemed almost hid by the foreign intrusion. It must therefore be true that either the crab does not, in its adult form, shed its skin once a year, or else that oysters grow much more rapidly than they are believed to do.

But whether it be during the larva state or that of the adult crab the process of development by which the shell is produced must be one and the same. Immediately above the heart a mass of nucleated cells is formed, extending to the internal surface of the shell, from which it is separated by a layer of pigment, which gives colour to the new formation. Towards the base of this mass—that is, immediately above the heart—the cells are uniformly large and distinct, while an areolar tissue ramifies throughout the whole. As advance is made cells of less size appear; these increase in number, as they diminish in diameter, until they approach the layer of pigment, immediately beneath which they adapt themselves, by mutual compressions, into a polygonal form. This mass of cell-structure extends throughout the entire surface of the crab immediately beneath the old skin, the greater or less thickness of the new mass corresponding to that of the old: these cells, being the organs which collect the lime within their own cavities, give strength and solidity to the future protection of the animal.

The manner in which the skin is removed, as carried on in the lowest forms, is modified only to meet conditions. In the amphipods, which we (Report Brit. Assoc. 1855) have observed in glass jars, the act is not of long duration, and the animal appears not only capable of swimming about until the moment arrives, but has the power, during the moulting, of removing at almost every stage, if it be disturbed, from one place to another, for better security. It grasps with one or more of its anterior feet some fixed weed or secure material as an anchorage; it then commences to free itself, which appears not to be an act of discomfort, if we may judge from the small amount of trouble with which the operation is conducted. The process appears, as in the crab, to be the result of an internal growth by which the animal has become too large for the skin. It splits at the margin where the dorsal and sternal arches of the three anterior segments of the pereion meet. After some tolerable exertion the posterior portion of the animal, together with its limbs, is withdrawn from its position in the old skin, and then follows the body, and lastly a few more struggles and the head is free, with the entire animal from the old skin. Unless disturbed, the animal, which is extremely soft, rests for some time, as if exhausted, near the cast-off skeleton; however, should there be any cause, it is capable of swimming away immediately.

The new creature is a perfect representation of the old one slightly enlarged; every hair is produced complete. This is capable of demonstration before moulting, for we have repeatedly observed the new hairs attached to the new skin while examining specimens under the microscope, where the second layer of similarly furnished integuments is distinctly visible; and it has always appeared to be a curious fact, and contrary to anticipation, that the new materials (hairs, spines, &c.) are not developed within each corresponding hair, spine, tooth, &c., they being visible as a second and independent armature.

The crevices among rocks and the shelter afforded by overhanging stones are the abodes of most of the larger crabs and lobsters, particularly those which dwell upon the shores. Great activity most of them possess, and will often, when the rocks are slippery, give much trouble and perhaps more than a single fall before you can secure one. Professor Kinahan states that in the Chinca Islands, "Running over shingle, foraging among the dead sea-lions and other animal and vegetable remains, climbing in immense numbers over the perpendicular faces of the cliffs above, the wrinkled beach-crabs (*Grapsus strigosus*), most striking from their gaudy colours, size and swiftness, cannot fail to arrest the attention of even an unscientific observer; the chase after them, especially on the summits of the cliffs, is exciting, being fraught with danger through the slipperiness of the foothold. It was most laughable to see the way in which they would at times, after escaping capture, behind some inaccessible projecting point, peep round a corner at you, as though exulting in having eluded your pursuit. They may be often seen, too, in fierce combat on the rocks, but seemingly as careful as any delicate young lady of wetting their feet."

The abode of others appear to be chosen from a more decided advantage which is instinctively known to the animal. The pearly raspberry crab (*Porcellana perlata*), Professor Kinahan tells us, chooses the empty shell of the fixed Balani to coil itself in; and we know that some, without being parasitic in the correct meaning of the word, attach themselves to fish or pieces of wood, and swim the ocean by their assistance. These latter have the last pair of legs so arranged as to have the appearance of being placed upon their backs, distorted from their normal position by the continual practice, from generation to generation, of straining the limbs to grasp at things *almost* beyond their reach, just as artificial circumstances change the appearance and physical condition. A ready example strikes us in the flat-headed Indian. And Mr. Dilwyn, in his 'Contributions to a Natural History of Swansea,' tells us how a dog, having got its nose cut with a stone, ever after retained a cleft lip, a peculiarity that was exhibited in all its after progeny, and only gradually died out in future generations.

These floating crabs are generally pelagic, and found near the great sargossan beds, which extend, particularly in the North Atlantic, on every side, far beyond the distance that the eye can reach, like the swathes of an immense ocean-prairie.

Mr. Darwin, in his previously-quoted 'Naturalist's Voyage,' speaks of one of these crabs as of a very remarkable structure: "It is allied to the notopods (or those crabs which have their posterior legs placed almost on their back, for the purpose of adhering to the under side of the rocks). The penultimate joint, instead of terminating in a simple claw, ends in three bristle-like appendages of dissimilar lengths, the longest equalling that of the entire legs. These claws are very thin, and are serrated with the finest teeth, directed backwards. Their curved extremities are flattened, and on this part five most minute cups are placed, which seem to act in the same manner as the sucker on the arm of the cuttle-fish." As this animal lives in the open sea, and probably wants a place of rest, I suppose this beautiful and anomalous structure is adapted to take hold of floating marine animals.

But in Nature there is a wonderful distribution of animals, as if to demonstrate to us how small a change in physical condition is necessary to make apparently the same creature exist under directly opposite circumstances. We have seen that some crabs live without perhaps ever touching fixed ground; so there are others that as seldom enter the sea. The land crabs (*Gegarcinas*) of Jamaica and the eastern Archipelago, exist many miles from the sea-shore, which they only visit to enable the young to free themselves from their egg-cases; marching in a huge phalanx many deep, they instinctively proceed to the nearest shore in a direct course and allow no obstacle to turn them aside from their path. For a short time the young live in the sea, but ultimately they quit it for the land and live in marshy districts where herbage is to be met with. A genus of East India (Thelphusa) has been noticed by Bishop Heber, in his 'Indian Journal,' to feed on grass and the young stalks of rice. The Deccan swarms with them; they burrow in the ground, whither they carry their food in a bundle often as big as themselves. "It is amusing," he says, "to see the crabs sitting, as it were, upright, to cut their way with their sharp pincers, and then waddling off with their sheaf within holes, as quick as their sidelong pace will carry them." It appears absolutely necessary that they should dwell where moisture is abundant, in order that the branchial organs may have the surface kept damp, for they appear not otherwise to be endowed with the capability of absorbing the oxygen from the surrounding atmosphere.

The apparatus by which the oxygen is brought into contact with the blood consists of a series of very thin flat plates, laid side by side and strung together by the middle from the upper to the lower edges. Through the central column flows in, at the lower margin, the impure blood, which is returned again along the upper in an invigorated state, having in the meantime passed into the thin lateral plates, between which the water in marine and the air in terrestrial Crustacea passes; these plates are kept asunder by moisture and a peculiar apparatus that was first pointed out to me by Prof. Quekett. Each plate upon the upper margin has one or two small prominences, unimportant in each individual specimen, but in the aggregate the many form one or two considerable ridges traversing the entire column. Each branchia is an appendage to one of the limbs. The two anterior pairs of these limbs are in these crabs formed so as to be appendages immediately attendant upon the mouth; to one of these the branchial organs, instead of being developed into a true branchial column, is formed into a long flat lash, flexible and sweeping, arranged so as to overlie the branchiæ: this flabella has the edges fringed with long hairs, each of which is notched with many small teeth. The membrane lining the branchial vault is similarly furnished. The hairs upon the long flabella, as it sweeps the surface of the branches, hitch their teeth in the prominent ridges and separate each of the plates from contact with its neighbour, and thus facilitate the more perfect action of the fluids.

But as we descend from those in which the blood flows through canals adapted for the purpose, to others where it merely passes through channels between the muscles, we find that the organs adapted to aërate the blood is of a less complex character. In the Amphipoda and some of the Stomapoda they consist of a series of single chamber-cells, analogous in character to that of a single plate of the more perfect organ, and to which they bear a complete resemblance when in a larval condition.

In the Isopoda we have a broad demarcation. In all the previous forms the branchial organs are developed upon the anterior portion of the animal (the pereion), which supports the true or walking legs. In the Isopoda they are formed beneath the pleon or posterior portion of the animal, where they are arranged in the form of a succession of leaflets, in corresponding pairs. It is a very curious circumstance, and one that must widely separate the order in which it exists from others. I have observed, in the early conditions, a strong pulsatory beat at the extremity of the tail of the larva of the prawn.

In the Squilla there are developed branches and complicated branchiæ attached to the pleopoda, but they differ much in form from those of the Isopoda; but, wherever situated, they have but a simple office to fulfil, the admission of oxygen through their thin walls to mix with the blood within.

We have often used the term blood, but Professor Agassiz has shown that the fluid that passes through the veins of animals lower than fish is not blood, that it wants a churning more in the vat of Nature to make it into true blood; and that the lower in the scale of animal existence it is found, the nearer in its nature is it to chyle, or the first character that the substance assumes after it has passed from that of digested food. Hence we can understand how it is that certain Crustacea change their colour, in accordance with that of the weed on which they live, being green where the Ulvæ grow, and anon they are purple where the red weeds are most abundant.

This circumstance offers in itself a means of protection from their numerous enemies, for, coloured like the weed, they creep about among the branches unobserved, and hide securely beneath the shadow of the leaves. In this way crawls about the long Idotea, whereas others hide beneath the stones, or build for themselves a secure abode.

The genus Amphithoë takes shelter in deep crevices between stones or at the roots of weed, there making use of stray bits of weed and small stones, which it cements by the aid of a fine thread-like substance (how secreted we cannot tell), twisted and twined in every possible direction. Binding the materials into a mass shapes it to a nest, beneath which it takes rest in peace. I have seen them, when freshly captured and put into a vase of water, take up a position upon a leaf of weed and curl it to a nest, cement the edges well together, leaving the ends open, and live securely there. But some are more ingenious still. The variegated Podocerus, that is plentifully to be found amongst the weed that attaches itself to large buoys, builds perfect nests in the branches of the zoophytes that are planted there. A colony as thick as rooks are to be found ranged together; there the little things sit and push out the head only, and with the long antennæ beat the water, keeping guard. These nests in their appearance bear no unstriking resemblance to that of many birds.

Others, again, change the style of their abodes; instead of secreting threads they make use of mud and clay to perfect the walls, and then secrete a substance that forms a silky lining upon the internal surface. These abodes are generally long and tubular, open at each extremity, and although they are apparently of the diameter suited closely to fit the animal, yet they have the power to turn in their abodes. If annoyed at one extremity, they will turn round and push their heads out of the other. This abode is their place of refuge, and nothing will drive them out but the destruction of their homes. In this way lives the genus Cerapus, which Mr. Say tells us has the power of swimming about with its house on its back, and will crawl amongst the weed, still dragging it after; not so its near ally, the Siphonœcetus, which anchors its tube to the branches of some zoophyte.

The habit in these lower forms brings to mind the instinct of the soldier crab, which secures for its convenience the cast-off shells of some mollusk. The species of this genus, when young, bear a near relation to the form of a young lobster. The body of the animal, which is soft and fleshy in the adult, is covered with the integument common to them, traces of which remain in patches even in the adult. During the earlier period the soldier crab swims the surface of the sea in fine weather, but when it grows a little older it seeks a shelter in some convenient shell. These generally they find dead, but sometimes they turn out the possessor, making an attack at some convenient moment, and probably " eat it out of house and home," in the truest meaning of the saying. They no doubt attack and devour mollusks, but the probability is that they do this for the sake of food, and not to obtain the shell in which to reside, but that afterwards, should they want a shell—and they often do change, "just for the fun of the thing"—they may take possession of the one that they had emptied. This statement, probably, holds more true of the older forms, which generally live in the shell of the common whelk, which generally outgrows its abode, so that it is not easy to draw itself into the shell, and therefore falls an easy prey to the burglar crab. Into the shell, when empty, the young crab gets, and, choosing one corresponding in dimensions, occupies it until it outgrows it; then seeks a fresh and larger shell. We have been told how it rambles along the beach in search of a new habitation, and, having found it, clambers from the old shell to the new, holding, like a cautious individual, by the old abode until it has been proved and found suitable. Should it be too small or otherwise rejected, the crab returns to its former shell and waddles away in search of another. I have frequently observed them in confinement, and have often tickled them out of the shell through a hole at the apex of the spine, for the purpose of seeing them get in again. The act baffles all description; it is so inimitably grotesque that it was always a wonder to me that they could do it themselves without laughing; but their gravity was half the fun. When one gets out of its shell it seems in a dreadful state of alarm; to say "it looks like a fish out of water" scarcely realizes the amount of its desire to get back again; it runs to the first shell it can get, puts its feet (not the claws) one upon each side of the shell and bounds in, vaulting much like an athletic youth will leap a gate, except that the crab throws its body between its legs,—an act the man cannot do, except some jugglers at a show. Sometimes, in its eagerness to get into a shell, it chooses one much too small; the shell covers perhaps but half its body. No matter; there it will remain, like an overgrown schoolboy with his coat too small, regardless of all criticism, until it finds a more suitable abode, which it loses no opportunity to obtain.

Sometimes the opposite extreme may occur, and the crab may find itself in a shell too large, one that it can scarcely manage. When the shell is on its back, the weight of the little fellow is not enough perhaps to toss it over; but in perseverance more than one animal of the lower forms in this respect is teacher to man: the little crab struggles and tries, gets its feet to touch the ground, and over comes the shell. Alas! it covers the animal entirely, but still the inconvenience is borne until a new tenement can be procured. I recollect once seeing a small crab, under these circumstances, get into a too big shell; it had not been there long before a larger crab approached. The little fellow, no doubt, feeling that it was not in its own abode, felt confident of trespassing, and then, like a self-convicted creature, sneaked in out of sight.

How often it is we find that individuals, in their efforts to avoid detection, exactly perform that which leads to their exposure! The big crab came up and felt the shell all over, twisted and turned it about, and found it to be the very one that was wanted. I could just see the smaller crab within watching for the intruder to go away; but it was not to be: the shell suited, so big crab jumped in! As the big one advanced within the shell the little one went further in, retiring deeper and deeper as the big one got in; but of course there must be an end to this; there was a point at which the little crab could go no further. When it got to the end of the shell it stopped; but still the big crab, perfectly unconscious of its neighbour, prepared finally to occupy the shell. It had scarcely got into the entire depth of the shell, when it came in contact with the small crab within, which immediately gave its soft tail a pinch. I shall never forget the hurry with which the larger one bounced out again—tear away; it could not get out fast enough, with a strong expression on its countenance of unmitigated disgust and astonishment.

No doubt but many may think that to speak of the countenance of a crab is merely a figure of speech. Not so. The shepherd sees in the face of his sheep an expression peculiar to every one of his flock, and knows each by his features, with more certainty than a less observing man will recognize men in a crowd. So it is among the lower animals: the attentive observer will perceive an expression, in almost every one in a species, that marks its individuality; and there can be little doubt but that there is as great diversity of appearance and character, though in a less striking degree, among the lower forms, as there is among the highest.

Both crabs looked out for a new abode, feeling assured that the old one was not "canny." It not unfrequently happens that one will remain for a considerable time in the same shell, but it is in consequence of a sponge fixing itself upon the shell and growing over it: the sponge grows on and covers the shell, the presence of the crab alone preventing it from closing the mouth also. Through this orifice the crab passes in and out and runs about with its house, which looks like a moving mass of sponge.

Some of the Macroura (or long-tailed Crustacea) take up their abode deep in the mud or sand beneath the sea, into which they burrow for themselves galleries of very great length. There are among the amphipods some that have similar habits. The Corophium longicorne excavates its own way into hard clay or mud; this, probably, is as much in search of food as to live in. They seek and hunt the worms that live there, waging a perpetual war against the whole tribe. A battle of serpents—a fight between man and beast—would not form half so terrific a Laocoon as a conflict between a Corophium and a fine neried worm, if you could only magnify their forms. The serpent is smooth, and can only bite; the man or tiger has only claws and a mouth; but the worm is armed with sharp daggers that dart out from its side the whole length of its structure; and as for a mouth, you never saw anything so horrible. It opens its lips and protrudes a tongue at first, but it becomes a proboscis-like thing when out, and at the extremity it opens wide, great, pointed, hook-like nippers fringed with teeth; these close upon their prey, and then withdraw deep within the gullet of the animal.

Then, beneath this fierce creature, a dragon, in the form of Corophium,—a creature with huge horns, as long or longer than itself; these have the power to rend and tear and lacerate its enemy, and withal strong; they reach far and drag him down to earth.

It is a frightful combat—that is, it would be, if the animals were large enough to suggest terror. But is size necessary to be terrific? To the worm that is to be devoured the tiny amphipod, or the sharp point of a fisherman's hook, is as fearful a thing as a huge mis-shapen monster or a Sepoy's knife would be to us. I am glad I am not a worm or anything so small, for certainly among the less of created beings Nature puts on a more terrific feature than can be found among the larger of her works!

There are other Crustacea that burrow; the Chelura among amphipods, and Limnoria among isopods, work their way into wood fixed beneath the sea, where they excavate small tunnels, mining and counter-mining each other, rapidly tearing away the timber in which they work, to the destruction of many a stately pile and overthrow of costly labour.

The Chelura is an animal of comparative recent discovery. It was first met with by Professor Phillippi at Trieste, and in this country at Dublin, and described by Professor Allman, in the 'Annals of Natural History' (vol. xix. pp. 367—8). It appears, from the size of the excavation that it makes, to be much more destructive, individually, than the Limnoria; but the latter is so much more abundant and its presence more general, that, in an economical point of view, as an evil, it is much more important.

C. Spence Bate.

(To be continued.)

On the Habits of a Chinese Myriapod.

By Arthur Adams, Esq., F.L.S.

In many a sunshiny walk to the Bubbling Wells on the Pagoda my only and nearly constant companions have been the Mina birds and the poor worm whose peculiarities form the subject of this letter.

I am familiar with these two all the way there and back again, for the huge-bodied buffalo and the yelping dog, the oblique-eyed child or little-footed woman, are but casual road-side acquaintances.

The sky at this time of the year, and when the weather is fine, is of a pale clear blue, and the fields are fresh and emerald-green with the young wheat; the first swallow is a pleasing sight, and the quaint little children are spread over the landscape, for there are no hedges, filling small baskets with every esculent leaf and blade not sown by man. These are chiefly Compositæ and Cruciferæ, the knowing urchins carefully avoiding Euphorbiaceæ.

Our myriapod crawls in every sunny path. Above, but not much above him, go the early Andrænas—for the other bees are not yet out—with steady zigzag flight, always diligently seeking something. The insect world is not yet fairly roused from its winter's sleep. A glittering black Staphylinus alights upon the path, or a dull Aphodius falls down before you; an adventurous land-crab makes an experimental trip from one hole to another on a sunny mud-bank; and the dykes are filled with little pellucid fish, with big heads and large golden eyes.

As for the Mina bird, he is everywhere. As you pass through the Settlement a loud cheery note salutes your ear, and, on looking about to thank the feathered vocalist, you see, perched upon the cornice of the tallest house, a Mina, solitary, but apparently on good terms with himself, and piping, at intervals, in the fulness of his joy. The old women are sitting in groups before their doors, busy with their spinning and their cotton-pods; and there, beside them, disputing the crumbs with the ducks and the fowls, is the Mina bird. Among the buffaloes in the marsh by the river's brink, familiar and noisy, the Mina birds gather in little flocks, perching on the heads and backs of their flat-horned, mud-covered companions, or refreshing themselves by making short excursions to the adjacent homesteads. From the bamboo and fir-tree plantations, which make the temples so picturesque, issue forth the clear, sweet notes of the Mina, mingled with the impudent "quirk, quirk" of the magpie, the harsh screech of the longtailed butcher-bird, the noisy chatter of the blue jay, and the familiar chirp of the homely sparrow.

And on every path where the sun is at his brightest crawls our myriapod, urging his way onward "with a heart for any fate." Like his brother worms with legs less numerous, he is supremely ignorant of the sayings and doings of the powers above; so he prefers the dry, sunny paths, instead of the scented bean-fields and the shelter of the cotton plants; and gets crushed, in consequence, under the Juggernaut wheels of Chinese hand-barrows, or beneath the ponderous tread of labouring Coolie. Most of his consimilars are of retiring habits, love the seclusion of rotting logs, or seek the shelter of stones; but our familiar worm seems to love the sun. He encounters a great hulking spider, who jerks himself out of the way; he meets a little foraging party of ants, and he goes without flinching through their serried ranks, or, if he cannot go through them, he marches over them; fissures, which to him must be frightful chasms, he boldly encounters; hillocks, in his eyes rugged mountains, he faces and surmounts with ease.

With unfailing energy he works his "myriad" legs, seeking in his progress—who knows what? To me, who have so often watched his wanderings, his object still seems purposeless: I have not fathomed the mystery of his life. Unheeded he passes by the charming bells of Mazus pulchellus, a pigmy beauty, whose blossoms nearly touch the earth; he pushes under bits of straw and withered blades of grass; he evades the fallen cotton-pods, the beards of barley and the awns of rice; he disregards the thistle-down and the feathered seeds that lie in his way; he will reject a putrid land-crab, and turn up his (metaphorical) nose at a dead snail; he inclines towards a crushed fungus, but on second thoughts is not partial to toadstools; he makes for a decayed fragment of wood, but he does not banquet on that. As he crawls he perpetually forms "lines of grace and beauty" by the lateral undulations of his mobile body. I have named him Craspedosoma vagabunda, a long name, and one which reminds me how a facetious critic in the 'Annals' found fault with some short names in the 'Genera of Recent Mollusca;' but I think any one, save our critic, will allow that Aspa is nearly as good as Hispa, and at least one syllable longer than Ips, Trox, Cis, Blaps, Flos and Phos.

This Chinese species is an inch in length, of a dark chestnut-brown, bright and shining, and may be known by the pale oblong tubercles on the sides of the body, one on each segment; by a transverse, minutely punctate groove in the middle of each segment; and by the hinder margins of the segments being finely beaded. The terminal or caudal segment is furnished with four short bristles. These characters will serve to distinguish it from the two European species of the genus already known.

Arthur Adams.

Shanghai, March, 1861.

List of Lepidoptera hitherto found within the Province of Moray, &c.; arranged according to Doubleday's 'List,' Second Edition. By the Rev. George Gordon, M.A. *

Teeming with entomological information, as the pages of the 'Zoologist' have been since its commencement, there are to be found in them but few notices, in this department of Natural History, from the far North. The chief claim, then, which this list of the Lepidoptera of the province of Moray can present to the attention of the British entomologist arises from the latitude of the district to which it refers. Neither the number of species included in it, nor the rarity of any portion of them, would have merited a place in the pages of the 'Zoologist,' had this list been drawn up for any other part of our island that lay south of the Grampian range of mountains. Whatever interest or information this list may on other points convey, it will be held as a step towards ascertaining the northern range in Britain of several Lepidoptera hitherto not suspected of flourishing so near the arctic circle. Observers whose hunting-grounds lie in warmer latitudes will perhaps be surprised to learn that some of their favourite objects of pursuit have managed to cross the alpine heights of the Grampians; but, however this feat may have been accomplished, their surprise at these being captured in Moray will be somewhat moderated when they further learn that along the shores of the Firth wheat is the staple produce of the fields; that the barley of Moray and Easter Ross brings a high price in the London market; that nectarines, peaches and apricots ripen here on the open walls in ordinary seasons, and that even figs and sweet almonds are occasionally matured. From a table kindly drawn up by Dr. Geddes, H.E.I.C., it appears that the mean temperature at Elgin, for the six months April to September inclusive, is 53·1. This is the result of 4320 observations, made at 9 A.M. and 9 P.M., during the last six years, and on instruments kept entirely away from radiating influences, a position which should ever be chosen for registering thermometers in the North of Scotland, where in the course of a day the rays of the Midsummer sun come in from almost every point of the horizon. The annual average of rain for the same months and years has been 13·13 inches.

The province of Moray lies between the rivers Spey and Beauly, and is bounded on the south by the Northern Grampians, and on the north by the Moray Firth. Hence it forms the third subdivision

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* In continuation of the Fauna of Moray (Zool. 4462).

("North-East Highlands") of "No. 15" in Mr. H. C. Watson's arrangement of provinces, as given in his recent 'Supplement' to the 'Cybele Britannica,' part first, page 48. Had this list been published in the 'Zoologist' before Messrs. Boyd and More had drawn up their paper on the geographical distribution of the Diurni (Zool. 6018), the addition of Anthocharis Cardamines, Melitæa Artemis and Thanaos Tages would have been made to the denizens of this, the fifteenth province of Britain.

The enumeration of the northern Scottish Lepidoptera, given in the late Dr. Macgillivray's work on Bræmar, does not unfold the richness of the ground in this section of Entomology, and no other record of a like nature, bearing upon any part of the region between the Grampians and Ultima Thule, has yet been published. To make this paper, therefore, as useful as the limits allowed will permit, and an entomological index of that part of Britain which lies north of the Grampians, or of a line drawn from Aberdeen to Fort William, other species, found in the east, west and north of the Province of Moray, are added within parentheses, together with some extra-provincial localities for a few of the rarer Moray denizens.

The compiler lays it before the readers of the 'Zoologist' as a continuation of his endeavours to illustrate the Natural History of his native province, and as the result of his own recent observations and of some of his friends in this untrodden district. Finding that the repetition of the names of local discoverers after so many species would occupy too much space, a hearty though general acknowledgment is here made to those who have, by their observations and generous contributions, helped to make this List reach its present size, however small it may be compared with others drawn up after a more lengthened study, and in more genial climes. Four terms—*viz.*, common, frequent, occasional and rare—are here used to mark the comparative occurrence of species; but future observations must of course cause the latter two to be supplanted by the former in many instances.

The confidence with which most of the species are given arises from the circumstance that specimens from this district passed under the eye of Mr. Logan, whose invaluable instruction is here gratefully recorded. Dr. Innes, of Forres, Mr. Martin, of the Elgin Institution, Mr. James Macdonald, of the Elgin Academy, Mr. William Gordon, formerly Schoolmaster of Advie (now of Birnie), Mr. John Macdonald, of Queen Street, Elgin, and Mr. Thomson, Free-Church Schoolmaster at Cawdor, have kindly transmitted whatever they have met with as new or interesting in this or the other departments of provincial Natural History. The contributions of Mr. Grant, late of the Advie Post-Office (now in Australia), and of Mr. Thomas Bliss, of Darnaway, made in these rich localities of the North, have yielded many of the rarer species of this List; and it is owing to the persevering researches of Mr. W. C. Gellie, Cabinet-maker in Elgin, that Argynnis Selene, Lithosia complana and several Geometræ and Noctuæ have been detected in the province. Mr. Scott's list in the second volume of the 'Entomologist's Annual' is referred to by the word "Fochabers," and the species from Skye are noted either from specimens or a list furnished by Mr. J. Wingate, who has made many excellent discoveries in that island, seemingly a good locality, though little known to entomologists.

Pieris Brassicæ, P. Rapæ and P. Napi. All common.

Anthocharis Cardamines. Frequent From Strathspey to the shores of the Firth; plentiful in the valleys of the upper districts, as Dallas, &c.

Argynnis Aglaia. Occasional. Strathspey; Darnaway; banks of the Findhorn. (Abundant in the north-western parts of Sutherland, *Mr. John Macdonald*).

A. Euphrosyne. Common.

A. Selene. Occasional. Knock of Alves, *Mr. W. Gellie;* Cawdor, *Mr. Thomson.*

Melitæa Artemis. Rare. Near Forres, *Dr. Innes.*

Vanessa Urticæ. Common.

V. Io. Rare. South College garden, Elgin, 1857, *Mr. John Macdonald.*

V. Atalanta. Frequent. Reaching as far inland as Strathspey; abundant, in the more cultivated districts, in 1857.

(V. Cardui. Found in Buchan, *Rev. Mr. Whyte.* Both Mr. John Macdonald and Mr. Thomson feel pretty confident that they have seen it; the former in 1859, between Newton and Burghead; the latter near Elgin, in 1860).

Erebia blandina. Frequent in the western parts of the province. The Cluny hills, at Forres, is the most easterly station where it has been as yet detected.

Satyrus Semele. Frequent Hill of Birnie; Covesea, &c.

S. Janira. Common.

(S. Hyperanthus has been met with in the district of Buchan, Aberdeenshire, *Rev. J. Whyte,* and in Skye, *Mr. Wingate*).

Chortobius Davus. Rare. Falls of Glenlatterach; (Skye).

C. Pamphilus. Common.

Thecla Rubi. Occasional. Mill of Birnie; Shoggle; Oakwood, near Elgin; and Cawdor.

Polyommatus Phlæas. Frequent. Strathspey, &c., &c. (Our indefatigable and highly meritorious friend, Mr. Thomas Edward, states (Zool. 5824) that he saw in Banffshire what he considered a specimen of P. Hippothoë. It was not caught. We trust he will be more successful next start).

Lycæna Alexis. Common.

(L. Agestis, *var*. Artaxerxes, is found in Buchan. There is but one single patch of Helianthemum vulgare, on the shingle beaches near Oakenhead, known in the lower part of the province of Moray. This plant, however, is frequent in the upper districts, as in Badenoch, &c.: has the insect been found there?).

L. Alsus. Occasional. Banks of the Lossie, at Birnie; Knock of Alves; Cawdor.

Thanaos Tages. Occasional. Birnie; Covesea; Cawdor; ("Tain and Cromarty.")

Smerinthus Populi. Occasional.

Acherontia Atropos. Rare. Maviston, May, 1858, *Dr. Innes;* larvæ found same year, in potato fields near Elgin; another specimen from near Forres, in 1859, *Dr. Innes.* (Culmaily, Sutherlandshire, 1859, *Mr. P. P. Sellar.;* Skye, *Mr. Wingate*).

Sphinx Convolvuli. Occasional. Almost every summer a specimen or more are met with; in 1847 it was of frequent occurrence. At Ballindalloch, in 1860. Convolvulus arvensis, the reputed food of the larva of this Sphinx, is extremely rare in this district: some other plant must, to a certainty, afford nourishment to this insect in the early stage of its existence.

Macroglossa Stellatarum. Rare. In 1858 this species was met with in several localities, as at Advie, in Strathspey; Birnie; Glassgreen; Manse of Duffus, &c.

M. Bombyliformis. Rare. One specimen, found several years ago in the manse garden at Duffus, was given to Mr. John Hancock, and is now believed to be in the Newcastle Museum. (Sutherlandshire, *Zool.* 4436).

Cossus ligniperda. Rare. Darnaway forest, *Mr. Thomas Bliss,* 1856; on diseased oaks at Brodie, 1857, *Dr. Innes.*

Hepialus hectus. Occasional. (Sutherland; Skye).

H. lupulinus. Rare. Elgin, 1860, *Mr. John Macdonald.*

(H. sylvinus. Skye, *Mr. Wingate*).

H. Velleda. Rare. Darnaway, *Mr. T. Bliss;* near Elgin, *Mr. Gellie;* (Sutherland; Skye, where Mr. Wingate also finds *var.* carnus).

H. Humuli. Frequent.

Zygæna Filipendulæ. Occasional. Sand-hills near Burghead, 1826; Duffus hillock, *Dr. Robertson;* Knock of Alves; Rothes, &c.

Lithosia complana. Rare. Elgin, *Mr. Gellie.*

(Euthemonia russula. Skye, *Mr. Wingate.*

Chelonia Plantaginis. Occasional. Great numbers sporting one evening by a fir wood, hill of Birnie; ("Shetland," *Duncan*).

C. caja. Frequent, more so at villages near the sea.

Arctia fuliginosa. Frequent.

(A. lubricipeda. Skye, *Mr. Wingate*).

A. Menthastri. Frequent.

Orgyia fascelina. Rare in Moray; (Sutherland, *Zoöl.* 4436).

O. antiqua. Occasional. Elgin, *Mr. Gellie;* (Banffshire, *Dr. Gordon*, of Clunie).

Demas Coryli. Rare. Kilnflat; (Skye).

(Trichiura Cratægi. Skye, *Mr. Wingate*).

Pœcilocampa Populi. "Fochabers," *Mr. Scott* in Ent. An.

(Eriogaster lanestris. Bennevis, *Zool.* 847).

Bombyx Rubi. Rare. Dunevan, *Mr. Thomson;* (Skye, *Mr. Wingate*).

B. Callunæ. Frequent on moors and in woodland.

(Odonestis potatoria). Skye, *Mr. Wingate;* Sutherland, *Zool.* 4436).

Endromis versicolor. Rare. Two specimens of this beautiful species were caught in 1857, in the gardens of Brodie House, by Mr. Sim, the gardener; one of which will form part of the collection now being made up for the local department of the Elgin Museum.

Saturnia Carpini. Occasional. Birnie; Elgin; Advie; Forres, &c.

Epione apiciaria. Rare. Advie, Strathspey, *Mr. Grant.*

Rumia cratægata. Common.

Metrocampa margaritata. Occasional.

Ellopia fasciaria. Occasional. Mortlach; Knock of Alves; "Inverness," *Zool.* 400.

Selenia illunaria. Rare. Strathspey; Cawdor, *Mr. Thomson.*

S. lunaria. Rare. Near Elgin, *Mr. Gellie.*

Odontopera bidentata. Frequent.

Crocallis elinguaria. Occasional. Birnie; Elgin.

Himera pennaria. Rare. Birnie, October, 1857; (Skye).

(Nyssia zonaria. Skye, *Zool.* 1006).
Amphydasis betularia. Occasional. "Fochabers;" Elgin.
Boarmia repandata. Frequent.
(Tephrosia crepuscularia. Sutherland, *Zool.* 4436).
Gnophos obscurata. Rare. Near Elgin, *Mr. Gellie;* (Skye).
Dasydia obfuscata. Rare. (Sutherland, *Zool.* 5556).
Geometra papilionaria. Rare. Oakwood, at Elgin; Altyre.
Ephyra punctaria. Occasional. Elgin; Cawdor.
(Œ. pendularia. Sutherland, *Zool.* 4436).
(Venusia cambricaria. Bennevis, *Zool.* 847).
Acidalia bisetata. Rare.
A. remutata. Occasional.
A. aversata. Occasional.
Timandra amataria. Rare. Cawdor, *Mr. Thomson.*
Cabera pusaria. Frequent.
C. exanthemaria. Occasional.
Macaria liturata. Occasional.
(M. notata. Aberdeenshire, *Mr. Thomson*).
Halia wavaria. Occasional.
Numeria pulveraria. Occasional. Birnie; Cawdor; (Skye).
Scodiona belgiaria. Occasional. (Sutherland, *Zool.* 4436).
Fidonia atomaria. Common.
F. piniaria. Common.
(Aspilates citraria. Skye, *Mr. Wingate*).
Abraxas grossulariata. Frequent.
(Lomaspilis marginata. Skye, *Mr. Wingate*).
Cheimatobia brumata. Occasional.
Oporabia dilutata. Occasional. Birnie; Aldroughty.
O. filigrammaria. Rare.
Larentia didymata. Frequent.
L. multistrigaria. Occasional.
L. cæsiata. Occasional.
(L. ruficinctata. Sutherland, *Zool.* 847).
(L. salicata. Bennevis, *Zool.* 847; Skye).
L. olivata. Occasional.
L. pectinitaria. Frequent.
Emmelesia alchemillata. Common.
(E. albulata. Skye, *Mr. Wingate;* Aberdeen, *Zool.* 2401).
(E. affinitata. Skye, *Mr. Wingate*).
(E. ericetata. Sutherland, *Zool.* 847; Skye).
(E. blandiata. Bennevis, *Zool.* 847; Skye, *Mr. Wingate*).

Eupithecia succenturiata. Occasional.
E. helveticaria. Rare. Cawdor, *Mr. Thomson.*
(E. satyrata. Sutherlandshire, *Zool.* 4436).
E. castigata. Rare. Cawdor, *Mr. Thomson.*
(E. constrictata. Skye).
(E. nanata. Skye).
E. vulgata. Common.
E. absynthiata. Occasional.
E. minutata. Occasional.
E. assimilata. Occasional.
E. rectangulata. Occasional.
Lobophora lobulata. Occasional.
(L. hexapterata. Sutherland, *Zool.* 4436).
Thera simulata, T. coniferata of Curtis. Fort Augustus, *Zool.* 4436.
T. variata. Occasional.
Ypsipetes impluviata. Rare. Near Elgin, *Mr. Gellie.*
Y. elutata. Frequent.
Melanthia ocellata. Frequent.
(Melanippe hastata. Skye, *Mr. Wingate*).
(M. tristata. Bennevis, *Zool.* 847).
M. subtristata. Common.
M. montanata. Common.
M. fluctuata. Common.
Anticlea badiata. Occasional.
A. derivata. Occasional.
Coremia munitata. Common.
C. propugnata. Rare. Dufftown, *Mr. James Smart ;* (Skye).
C. ferrugata. Rare. Near Elgin, *Mr. Gellie.*
Camptogramma bilineata. Common.
(Phibalapteryx lignata. Aberdeen, *Zool.* 2401).
Cidaria psittacata. Common.
C. miata. Occasional.
(C. corylata. Skye).
C. russata. Occasional in Moray ; (Skye).
C. immanata. Common.
C. suffumata. Occasional.
C. prunata. Common.
C. testata. Common.
C. populata. Occasional. Glenfiddach ; Birnie ; "Inverness," *Zool.* 400.
C. fulvata. Occasional.

(C. silaceata and C. pyraliata. Skye, *Mr. Wingate*).

Eubolia palumbaria. Occasional.

(E. mensuraria. Sutherland, *Zool.* 5556 ; Skye, *Mr. Wingate.*

Carsia imbutata. "Dalwhinnie moor," *Zool.* 400 ; (Skye).

Anaitis plagiata. Rare. Wood near Scaat-craig.

Chesias spartiata. Occasional. Manbean, Sept. 1857.

C. obliquaria. Occasional. Birnie ; Cawdor.

Tanagra chærophyllata. Occasional. (Banffshire, *Dr. Gordon.*)

(Platypteryx lacertula. Sutherland, *Zool.* 4436 ; Skye).

(P. falcula. Sutherland, *Zool.* 4436).

Dicranura furcula. Rare. Near Elgin, *Mr. Gellie ;* (Banff, *Rev. W. Grigor ;* Skye, *Mr. Wingate*).

D. vinula. Occasional.

Pygæra bucephala. Occasional. Birnie ; Forres ; (Skye).

(Clostera reclusa. Skye, *Mr. Wingate ;* Bennevis, *Zool.* 486).

Notodonta camelina. Rare. Elgin, *Mr. Gellie ;* (Skye).

N. carmelita. Rare. Oakwood near Elgin, *Mr. Gellie.*

N. dictæa. Rare. Elgin, *Mr. John Macdonald* and *Mr. Gellie.*

N. dromedarius. Rare. Ladies' Walk, Elgin, *Mr. Gellie.*

(N. ziczac. "Fort William," *Zool.* 487 ; Skye, *Mr. Wingate*).

Thyatira Batis. Rare. Birnie, 1857 ; Oakwood, *Mr. Gellie.*

Cymatophora duplaris. Rare. Birnie ; (Sutherland, *Zool.* 4436 ; Ross-shire, *Zool.* 847).

C. flavicornis. "Fochabers," *Ent. An.* for 1856.

Acronycta Psi. Occasional. Slotfield ; Cawdor ; (Skye).

A. leporina. Rare. Deanshaugh, Elgin, *Mr. Gellie.*

A. Ligustri. Rare. Palmercross, Elgin, *Mr. Gellie.*

A. Rumicis. Occasional. (Skye).

(A. Menyanthidis. Skye, *Mr. Wingate*).

A. Myricæ. Rare. Falls of the Lossie.

Leucania conigera. Occasional. Birnie ; Drainie, *Rev. J. Weir.*

L. lithargyria. Rare. Near Elgin, *Mr. Gellie.*

L. impura. Frequent.

L. pallens. Common.

(Nonagria fulva. Skye, *Mr. Wingate*).

Hydræcia nictitans. Rare. Birnie, 1858 ; (Skye).

H. micacea. Frequent. At Climatis, 1857.

(Axylia putris. Skye).

Xylophasia rurea. Common.

X. polyodon. Common.

(Heliophobus popularis. Aberdeen, *Macgillivray's ' Bræmar.'*)

Charæas Graminis. Frequent.

Luperina testacea. Occasional. Elgin, *Mr. Martin ;* Darnaway, *Mr. Bliss.*

Mamestra furva. Rare. Elgin, *Mr. Gellie.*

M. Brassicæ. Common.

Apamea basilinea. Common,

A. gemina. Common.

A. oculea. Common.

(Miana strigilis. Skye).

M. fasciuncula. Occasional. Mortlach, *Mr. James Smart.*

Caradrina cubicularis. Common.

Rusina tenebrosa. Occasional.

Agrotis valligera. Rare. Lesmurdie Cottage, *Mr. Gellie.*

A. Segetum. Rare.

A. lunigera. Occasional.

A. exclamationis. Frequent.

A. corticea. Rare. Birnie.

A. cursoria. Rare.

A. nigricans. Rare. Near Elgin, *Mr. Gellie.*

A. Tritici. Occasional. Elgin and Main, *Mr. Gellie.*

A. agathina. "Fochabers."

A. porphyrea. Occasional. (Skye, *Mr. Wingate*).

A. præcox. "Fochabers."

A. pyrophila. Occasional.

Triphæna ianthina. Common.

T. fimbria. Rare. Elgin Institution, *Mr. Martin ;* (Banffshire ; Skye).

T. orbona. Frequent. Dark variety, occasional.

T. pronuba. Occasional.

Noctua glareosa. Rare. Elgin, *Mr. Gellie ;* (Skye, *Mr. Wingate*).

N. depuncta. Rare. Dufftown, *Mr. James Smart ;* Elgin ; "Fochabers."

N. augur. Common.

N. plecta. Occasional. Birnie ; Scroggie Mill ; Cawdor.

N. C-nigrum. Common.

N. brunnea. Occasional.

N. festiva. Occasional.

N. Rubi. Frequent.

N. umbrosa. Occasional.

N. baja. Occasional. Birnie ; Elgin ; Drainie.

N. xanthographa. Common.

Trachea piniperda. Occasional. Birnie, 1858; "Fochabers;" Cawdor.

Tæniocampa gothica. Frequent.

T. rubricosa. Rare.

T. instabilis. Rare. Main, *Mr. Gellie.*

T. stabilis. Rare. Elgin, *Mr. Gellie.*

Anchocelis litura. Rare. Birnie, 1858; Elgin, *Mr. Gellie.*

Cerastis Vaccinii. Rare. Oakwood, near Elgin, *Mr. Gellie;* (Skye).

Scopelosoma satellitia. Rare. Bræmorriston, *Mr. Gellie.*

Xanthia cerago. Frequent.

X. silago. Rare. Birnie; Bræmorriston, *Mr. Gellie.*

X. ferruginea. Occasional. Birnie; Brodie; Bræmorriston.

Cosmia trapezina. Rare. Elgin, *Mr. Gellie;* (Skye).

Dianthæcia Cucubali. Rare. Mill of Birnie; (Skye).

Polia Chi. Occasional.

Epunda lutulenta. Rare.

E. nigra. Frequent.

Miselia Oxyacanthæ. Occasional.

Agriopis aprilina. Rare. Oakwood, Elgin, *Mr. Gellie.*

Phlogophora meticulosa. Occasional.

Euplexia lucipara. Occasional.

(Aplecta occulta. Tain, *Mr. Weaver,* Zool. 5556).

A. nebulosa. Occasional.

Hadena adusta. Occasional.

H. glauca. Rare. Near Birnie.

H. dentina. Common.

H. oleracea. Common.

H. thalassina. Common.

H. rectilinea. Rare. Bilboahall, *Mr. Gellie;* (Sutherland, *Zool.* 4436).

Calocampa vetusta. Rare. Birnie; (Tain, *Zool.* 5556; Skye).

C. exoleta. Occasional. Birnie; Advie.

(Cucullia umbratica. Skye, *Mr. Wingate*).

Anarta cordigera. Rare. Knock Frink, Strathspey, *Mr. W. Gordon.*

A. Myrtilli. Occasional. Moorish ground at Birnie; Elgin, *Mr. Gellie.*

(Erastria fuscula. Dingwall, *Zool.* 847).

Brephos Parthenias. Rare. Wood at Altyre, April, 1857.

Abrostola Urticæ. Common.

Plusia chrysitis. Occasional.

P. bractea. Rare. Near Birnie, 1855, *Mr. W. Gordon;* (Skye).
P. Festucæ. Rare. Birnie; Oakwood, Elgin, *Mr. Gellie.*
(P. Iota. Skye, *Mr. Wingate*).
P. V-aureum. Occasional. Kellas; St. Andrews; &c.
P. Gamma. Common.
(P. interrogationis. Sutherland, *Zool.* 847, 5556).
Gonoptera Libatrix. Occasional. Birnie; Aberlour.
Amphipyra Tragopogonis. Common.
Mania typica. Occasional. Darnaway; Drainie; &c.
(Stilbia anomala. Bennevis, *Zool.* 400; Sutherland, *Zool.* 847).
(Euclidia Mi. Aberdeen, *Zool.* 2401).
Phytometra ænea. Occasional. Shoggleburn, near the fall.

Within the province of Moray so little attention has been paid to the remaining tribes of Lepidoptera, that it will be doing ample justice here simply to enumerate, *in cumulo*, the few species that have as yet been detected in a field which, judging from the preceding part of this paper, must be prolific also in Micro-Lepidoptera. "F." marks those found by Mr. Scott about Fochabers, and published in the 'Entomologist's Annual,' vol. ii. The species within parentheses have not yet been found in the province of Moray; "E." "W." and "N." indicating that the locality on this side of the Grampians lies to the east, west or north of Moray. Notices given by Mr. Buxton and others (Zool. 847, 2401, 4436, 5556) are here quoted for the localities of several species.

Hypena proboscidalis.

Aglossa pinguinalis. Ennychia cingulalis; (E. octomaculalis, W.) Hydrocampa nymphæalis, F. Botys fuscalis. Pionea forficalis. (Scopula alpinalis, W.); S. lutealis; (S. decrepitalis, N.) Scoparia muralis; S. lineolalis.

Crambus pratellus; (C. ericellus, N.); (C. margaritellus, W.); C. pinetellus; C. tristellus; C. culmellus; C. hortuellus. (Phycis abietella, W.) Melia sociella.

Halias prasinana, near Elgin, *Mr. G. Christie.* Tortrix ribeana; T. unifasciana; (T. viburnana, E., W. and N.); T. ministrana; T. adjunctana. (Peronea favillaceana, W.); (P. rufana, N.); P. mixtana; (P. Schalleriana, W.); (P. caledoniana, F.); P. variegana; (P. ferrugana, N.); (P. tristana, W.) Teras contaminana. (Penthina prælongana, N.); P. cynosbana. (Pardia tripunctana, W.) (Sericoris cespitana, E.); S. lacunana; (S. micana, E. and N.) Mixodia palustrana, F. (Cnephasia lepidana and C. musculana, N.) (Sciaphila octomaculana, W.) (Phoxopteryx unguicana, P. biarcuana, P. myrtillana, P. lundana and P. ramana, N.) Ephippiphora Brunnichiana. (Coccyx argyrana, N.) Retinia resinana, F.; R. duplana, F. (Dicrorampha senectana and D. simpliciana, E.) (Pyrodes rhediana, E.) Eupœcilia angustana; (E. ruficiliana, N.) (Argyrolepia badiana, E.) (Cochylis stramineana, E.) (Aphelia pratana, W.)

(Epigraphia Steinkellneriella, N.) Tinea tapetzella. (Lampronia prælatella, N.) (Incurvaria Zinckenella, N.); (I. Œhlmanniella, N.) (Micropteryx calthella and M. allionella, N.) M. purpurella, M. unimaculella, M. Sparmanella and M. subpurpurella, F. Nemophora Swammerdammella; (N. Schwarziella, N.) (Adela cuprella, N.) (Swammerdamia cæsiella, N.) (Pepilla Curtisella, E.) Plutella xylostella, most abundant on turnips, in 1851. Depressaria costosella, D. umbellella, D. arenella, D. applanella. (Gelechia longicornella, N.) (G. proximella, N.) G. Hübnerella; G. instabilella. Pleurota bicostella. Endrosis fenestrella. (Röslerstammia Erxlebella, N.) (R. pronubella, N.) Tinagma resplendella. Argyresthia conjugella. Gracilaria semifasciella, N.); G. elongella, F.; G. fringipennella, F. Coriscium citrinella, F. (Ornix Loganella, N.) Coleophora viminetella, F. Chauliodus chærophyllella, F. Chrysoclista Schrankella, F. (Chrysocoris festaliella, N.) Elachista kilmunella and E. zonariella, F. Lithocolletis vacciniella, L. Frolichiella, L. Dunningiella, L. stettinella and L. Klemannella, F.; (L. caledoniella, N.) Semiostoma spartifoliella. (Bucculatrix Demaryella, N.)

(Pterophorus acanthodactylus, N.) Alucita polydactyla.

This list is deficient in due proportion of marsh or fen species; there are, however, promising localities in the province of Moray, which, if well searched, would supply the deficiency. Not a single capture is here recorded from the Loch of Spynie, whose wide-spreading borders, studded with a variety of aquatic plants, must contain many Lepidoptera peculiar to such situations. The peaks and fastnesses of the sub-alpine heights of the province, and the deep recesses of its woods, have been almost unvisited by the entomologist. To show that there is still much to be done, even among the Macro-Lepidoptera of the North of Scotland, it need only be stated that from this, the fullest list yet published, there are absent upwards of twenty species, each of whose localities Mr. Stainton, in his 'Manual,' characterizes by the expression "everywhere."

Two excellent papers were published in the 'Naturalist,' in 1851 and 1852, *viz.*, 'Notes on the Lepidoptera of the West of Scotland and of Fifeshire,' by Mr. J. Gray, and 'The Lepidopterous Insects of Midlothian,' by Messrs. Lowe and Logan. They afford good materials for comparison with the contents of the present paper. Mr. Gray's ground forms almost a band, sweeping from sea to sea, south of the Grampians; and its species may be laid alongside those here enumerated, and which occur in a similar band, but north of the same mountain range, from Skye to Aberdeen. Messrs. Lowe and Logan's paper is confined to Midlothian; and as both are districts on the east coast of the island, its species may be compared with those found within the province of Moray. Hence the following table is constructed, in which "N.G." represents North of Scotland, "W.F." West of Scotland and Fifeshire, "M." province of Moray, "Mid" Midlothian, and "C." common to both.

	N.G.	W.F.	C.	M.	Mid.	C.
Diurni - - -	23	25	20	20	25	15
Nocturni - -	32	29	20	24	31	18
Geometræ - -	97	81	64	75	103	63
Drepanulæ - -	2	1	1	0	1	0
Pseudo-Bombyces	9	9	8	7	8	6
Noctuæ - - -	106	92	76	95	118	80
Deltoides - -	1	1	1	1	1	1
Pyralides - -	12	9	6	8	18	7
	282	247	196	230	305	190

The constant change of nomenclature which this department of natural science so grievously suffers, makes it difficult, in some instances, while comparing different faunas, to ascertain the synonym. The numbers, then, in this table may not be absolutely correct. Mr. Logan has favoured me with the Midlothian additions; but ten years have passed since Mr. Gray's paper here used was published, and the fauna of the district he then reported on has doubtless in the interim been found to contain other species, as every season continues to yield fresh numbers to the already known lepidopterous denizens of the North of Scotland.

In this paper errors and omissions must exist. It is hoped that the readers of the 'Zoologist' will kindly supply notes of correction, and that such of them as cross the Grampians, armed with net and box, will, through its pages, make known the prizes they have the fortune to secure.

G. Gordon.

Birnie by Elgin.

Scarcity of Sesia Muscæformis in 1861.—I have taken a trip to look after Sesia Muscæformis, but the wind and rain prevented my obtaining any in good condition, Although I worked hard for two or three weeks I only obtained two specimens.—*George King; Union Street, Torquay, July* 16, 1861.

[Mr. Doubleday, with his customary care to obtain the correct name of every new British Lepidopteron, sent specimens of this species to M. Guenée, who pronounces them to be Sesia Muscæformis of his cabinet, and *not* S. Philanthiformis, which he also possesses, and which is a different species. In any list hereafter published by M. Guenée or Mr. Doubleday Mr. King's insect will therefore stand as Sesia Muscæformis. I fear I was the author of the original mistake in naming this insect, having supposed Philanthiformis and Muscæformis to be merely synonyms of the same insect. Mr. Reading in his learned paper (Zool. 7280) has adopted this unfortunate error.—*Edward Newman.*]

Further Note on the Supposed New Irish Zygæna.—Of course my note in a late number of the 'Zoologist' (Zool. 7565) has produced many communications on the same subject, the most interesting of which are, first, a letter from M. Guenée, addressed to Mr. Doubleday, and, secondly, a visit from Mr. Birchall. From M. Guenée's letter it appears manifest that that greatest of Lepidopterists considers that the two Irish Zygænæ are distinct as species; the one which we have so long known by the name of Minos, and which is particularly distinguished by its black woolly or hairy body, he believes to be undescribed; and the comparatively recent addition to our fauna, which I announced in the June number, he regards as the true Zygæna Minos. This view of the case is corroborated by a most careful comparison of a pair of continental specimens of Zygæna Minos, sent over by Herrich-Schæffer, with the insects taken in Ireland, and one of which I had supposed to be Z. Achilleæ. The continental specimens have been kindly presented to the cabinet of the Entomological Club by Mr. Birchall, and have been placed side by side with others of his own taking. A pair of continental Zygænæ, presented by Mr. Doubleday to Mr. Birchall, were at the same time submitted to a like critical examination, with the result that one of them was certainly identical both with Herrich-Schæffer's Z. Minos and with Mr. Birchall's new Irish insect; the second specimen, however, seemed to differ, being a much more opaque insect, somewhat larger, irrorated with testaceous scales, and having a whitish or grayish tuft on each side of the mesothorax at the base of the fore wings, extending on to the wing itself. These differences at first induced both Mr. Birchall and myself to think that the two specimens in question were referrible to different species, the one probably being the true Z. Minos, the other the true Z. Achilleæ, but even this conclusion appears doubtful, since we found the testaceous scales often present in the Irish specimens, and in a few instances the gray tuft at the base of the fore wings is also very distinctly present. Under these circumstances it seems best to eliminate the name of L. Achilleæ from the discussion, and to confine our attention to the two species, or supposed species, which I endeavoured to differentiate at page 7565. Let us call the most familiar black-bodied insect Zygæna nubigena, thus adopting a cabinet name used both in France and Germany, and one which M. Guenée proposes to adopt should he ever describe this tribe of insects. And let us inquire how it came to be called Z. Minos in England, and in England only. The first notice of the insect is from my own pen, and runs thus:—" I am informed by my friend Mr. Thomas H. Allis that about a dozen specimens of Zygæna Minos were taken last summer on the west coast of Ireland by Henry Milner, Esq., of Nunappleton, near York."—*Zool.* 4180, *dated January,*

1854. Mr. Stevens (Zool. 4272) is reported to have exhibited at the Entomological Society's Meeting specimens of the new British Zygæna Minos. At Zool. 4436 is a most interesting paper by Mr. A. G. More on the geographical distribution of Zygæna Minos in the West of Ireland. Such were the earliest notices of this insect, all adopting, without hesitation, a name for which no authority had then been given. Latterly Mr. Doubleday places it in his Synonymic List as Z. Minos, *W. V.* The Vienna Catalogue is certainly high authority when we know what is intended, but, alas! in this, as in too many other instances, it is now too late to inquire what its learned authors meant by the name. It will not, I think, be urged by Mr. Allis, with whom the name as applied to the Irish insect seems to have originated, that he ever went into the question of its nomenclature very critically. Let me now attempt to bestow on it a name which, even if not accepted, will at any rate challenge inquiry and discussion.

ZYGÆNA NUBIGENA, *Musæorum.*

Alæ anticæ semihyalinæ, nigrescentes, plaga magna difformi discali rubro; alæ posticæ rubræ margine tenuiter nigro: caput, thorax, et abdomen nigra, opaca, hirsuta.

The amount and disposition of the red colouring on the fore wings of the species of Zygæna has always been held of great importance in differentiating species; thus the terms "five-spot" and "six-spot" describe characters which in this country were for sixty years considered amply sufficient to distinguish our indigenous species. Although this is no longer the case, we may still consult these markings with advantage. In the two supposed species I am now considering the red area of the fore wings is divided by the wing-rays into three portions or blotches: the first blotch may be called *costal*; it originates at the base of the wing, and extends immediately beneath the costal margin; the second may be called *discal*, occupying, but not limited by, what is usually termed the discoidal cell; the third may be called the *inferior* blotch; it originates at the base of the wing, and extends towards the hind margin. The costal blotch is pointed at its distal extremity, and the discal blotch at its basal extremity. Mr. Birchall has pointed out to me that in the continental specimens of Z. Minos, these two points do not pass or overlook each other, whereas in Z. nubigena the passing or overlapping is most evident. In a letter from Mr. N. Cooke, of Liverpool, to Mr. Doubleday, this character is clearly shown by coloured sketches. This difference, I admit, appears very insignificant, but supposing that one form of blotching is constant to the black-bodied individuals, and the other form of blotching constant in the green-bodied individuals, it will aid us very materially in our attempts to establish the existence of two species. In addition I have only to say that I shall be much obliged for any information respecting the Z. Minos said to have been found both on the West and East Coasts of Scotland. I have seen neither.—*Edward Newman.*

Description of the Larva of Acidalia rusticata.—Falls off its food-plant, feigning death and remaining in a looped position when disturbed. Head rather small, very distinctly exserted: body having each segment divided into eight rings, these rings composed of minute warts, and these warts again emitting clavate or rather capitate bristles, so that the entire surface is rough, having the appearance and character of shagreen. Head nearly black: body brown, of two shades, rather prettily variegated. Feeds on Cratægus Oxyacantha (whitethorn), and is full fed by the end of May, when it spins a slight web among the leaves of its food-plant and changes to a pupa. The perfect insect appears in July. I am indebted for these very curious larvæ, as well as the following, to Mr. D. T. Button, who bred them from the egg.—*Edward Newman.*

Description of the Larva of Acidalia inornata.—Rests in a straight posture; does not fall off its food when touched. Head prone: body flattened, dilated at the sides; segments well defined, and each divided by transverse furrows into eight rings; these rings in the 2nd, 3rd, 4th, 9th and following segments are composed of warts, which emit short stumpy bristles. Colour red-brown, with little variation of shade, but having a whitish median spot on the back of the 6th and 7th segments. Feeds on Salix Russelliana (Bedford willow), and is full fed on the 30th of May, when it spins a slight web among the willow leaves, and therein changes to a pupa. The moth appeared on the 24th of June.—*Id.*

Description of the Larva of Corycia taminata.—Larva naked. Head and body green or purplish brown; a broad, purplish dorsal stripe, edged with white; spiracular line white; spiracles black; a narrow white band encircles the border at the junction of each segment. Feeds on wild cherry.—*B. H. Birks* (*in the 'Intelligencer'*) *; Stonor, Henley-on-Thames.*

Description of the Larva of Halia Wavaria.—Rests in a nearly straight posture, but with the head erected and porrected. When disturbed falls from its food bent double, and feigns death, remaining a long time perfectly without motion. Body slightly dilated at the sides, otherwise uniformly cylindrical: head lead-coloured, with black markings, the disposition of which differ in different individuals: back varies from an obscure apple-green colour to a decided lead colour, scarcely two individuals being precisely similar in hue, but all are longitudinally marked with approximate, waved, interrupted smoke-coloured lines; belly nearly coloured like the back; sides having each segment adorned with an amorphous canary-coloured blotch, which blotches give the appearance of a lateral yellow stripe. On all parts of the body are shining black warts, each of which emits from the summit a single black bristle; four of these warts are arranged in a transverse series on the back of the 2nd, 3rd and 4th segments, and four in a square on the back of the 5th and following segments, and three in each canary-coloured mark on the sides form a triangle, which comprises the spiracles; other similar bristle-emitting warts occur beneath: legs intensely black; claspers lead-coloured. Feeds on Ribes grossularia (common goooseberry), which it strips of its leaves much in the same manner as the gooseberry grub, a species of sawfly, with which it is often confounded. It is full fed by the third week in June, when it spins a slight web among the gooseberry leaves. The perfect moths appear on the wing throughout July.—*Edward Newman.*

Description of the Larva of Aspilates strigillaria.—Rests in nearly a straight posture, but falls from its food, tucks in its head and feigns death when touched or disturbed. Head rather porrected, simple, not divided on the crown, rather less in circumference than the body: body uniformly cylindrical, emitting here and there throughout its length short black bristles; it has two small dorsal warts on the 8th segment, two larger and nipple-shaped humps on the 9th segment, and two still smaller excrescences on the 10th segment, besides many other minute warts on different parts of the body; on the 13th segment, immediately above the anal claspers, and below the anal aperture, are two short points or processes directed backwards. The colours are very obscure, gray-brown of different shades, producing a somewhat mottled appearance, and the lighter colour assuming the form of narrow longitudinal stripes. The egg is laid in summer or autumn on Calluna vulgaris (common ling), and the young larva hybernates. It feeds again throughout the month of April, and is full fed early in May. It then spins a slight web among the twigs of its food-plant, and therein changes to a pupa. The moth appears about the 18th of June. I am indebted to Mr. Thomas Huckett for this and the following larva.—*Edward Newman.*

Description of the Larva of Hybernia defoliaria.—Rests in a curved position; does not tuck in its head, feign death, or fall off its food-plant when disturbed; head rather large, not notched on the crown; body uniformly cylindrical, without humps. Head without gloss, brown: body with a broad dorsal area of a clear brown colour; this area is bounded on each side by a very distinct but narrow, waved, black stripe, and is also adorned with gray markings, which are particularly conspicuous at the interstices of the segments where these approach the black boundary stripe; below the boundary stripe the body is bright yellow; the spiracles are white, and the region surrounding each spiracle brown; belly greenish yellow; legs and claspers pale. A beautiful but very abundant larva: it feeds on Corylus avellana (hazel), Cratægus Oxyacantha (whitethorn), Quercus Robur (oak), and many other trees, and is full fed at the middle of June, when it changes to a pupa on the surface of the earth. The moth appears in October.—*Id.*

Description of the Larva of Eupithecia dodoneata. — *Var.* 1. Ground colour ochreous-red. Central dorsal line very dusky olive, almost black, interrupted. Down the centre of back a series of blackish or dusky olive arrow-shaped blotches, reduced in size on the posterior, and merged in the central line on the anterior segments. Subdorsal lines slender, dusky, bordered with dull yellow. Spiracular line alternating between dull yellow and dusky olive. Between subdorsal and spiracular lines a row of slanting bright yellow stripes, interspersed with dusky blotches. Segmental divisions orange-red. Body thickly studded with minute white tubercles, and thinly clothed with whitish hairs. In appearance strongly resembles the larva of Eupithecia virgaureata.

Var. 2. Ground colour pale yellowish green. Central dorsal line and blotches similar to those of var. 1, but much paler olive. Spiracular line, segmental divisions and lateral stripes greenish yellow.

Var. 3. Ground colour orange-red. Back tinged and suffused with dull yellowish green. Dorsal blotches wanting. Central dorsal line reddish brown or olive, enlarged in the centre of each median segment. Subdorsal lines same colour, slender. Spiracular line and lateral stripes greenish yellow, the latter indistinct. Strongly resembles the larva of Eupithecia abbreviata. The larvæ from which the above description was taken were reared from eggs kindly sent me by Mr. M'Lachlan, of Forest Hill. They fed on oak, from which tree I have been in the habit of occasionally beating the larvæ for some years past. I have no doubt that it also feeds on whitethorn, as my friend Mr. Greene has frequently taken the pupa under the bark of this tree, at some distance from any oaks. It is a very delicate larva. Almost all mine, this summer, died when full fed. They seemed to prefer the youngest and most succulent oak leaves, and I principally attribute their death to the difficulty of finding a constant fresh supply of newly-expanded foliage. Pupa either enclosed in a slight earthen cocoon or under bark; dark dusky red; upper edge of wing-cases brighter red than the rest of the pupa: has a rough, wrinkled appearance. Perfect insect appears in May and beginning of June.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, July* 15.

Description of the Larva of Cidaria suffumata.—Rests in nearly a straight posture, its feet as well as claspers holding the food-plant; the head generally porrected and elevated: when disturbed it raises the fore part of its body and tucks in its head. Head rather small: body with a rough or wrinkled skin, and both head and body emit short scattered bristles, each bristle emanating from a scarcely perceptible wart; all the segments centrally swollen, especially below, but without dorsal humps. Colour of the head pale brown, freckled with black: colour of the body brown of various shades; the dorsal area decidedly darker than the ventral area, and separated by a clear line of demarcation; the 10th, 11th, 12th and 13th segments have the same pale hue above and below; the 2nd, 3rd and 4th segments are marked by a median whitish dorsal stripe; the 5th, 6th, 7th, 8th and 9th with a dark V-shaped mark, pointing towards the head, and its arms extending on each side as far as the spiracles; each V-shaped mark contains a median dark mark, somewhat shaped like an arrow-head, and bordered with a pale margin; the belly is traversed by gray, waved, interrupted and not clearly defined stripes, extending throughout its entire length; the spiracles are intensely black. I am indebted to the Rev. J. Hellins for this larva, who fed it on Galium Mollugo (great hedge bedstraw): with me it ate Asperula odorata (sweet woodruff), apparently with great enjoyment, but its natural food-plant is unknown to me: it spun among the leaves of the woodruff towards the middle of June, and the moth appeared in July.—*Edward Newman.*

Description of the Larva of Cidaria testata.—Rests in a straight posture, and does not fall off its food-plant when disturbed; head flat, porrected; body cylindrical, without humps. Head putty-coloured, with darker dots and reticulations: body putty-coloured; back with a slender median brown stripe; sides with two dingy white stripes, the upper straight, the lower undulating: the spiracles are placed below the second white stripe, and are intensely black; the belly has six whitish stripes, of which the median ones are closely approximate: the divisions of the segments are marked by slender rings of a pink tinge. Feeds on Betula alba (birch) and Salix capræa (sallow), and is full fed at the end of May, when it spins a few threads, and draws together the leaves of its food-plant, making a very open kind of net-work cocoon, so open indeed as not in any degree to hide the enclosed pupa, which will even drop out through the meshes if shaken. The pupa is rather long, and very pointed at the tail: it is of pale putty-colour, with a broad conspicuous median brown stripe down the thorax and abdomen: the oblique posterior margins of the thorax are also of the same dark colour: the cephalic and thoracic envelopes are dingy brown, lined with darker brown, by which colour the antennæ, legs, wing-rays, &c., are clearly indicated; the envelope of the antennæ slightly exceeds that of the wings in length; on the abdomen is a median dark stripe below, corresponding with that above, and the lateral region between these two stripes is spotted with dark brown. The perfect insects emerge from the pupæ about Midsummer Day. I am indebted to Mr. Thomas Huckett for the loan of the larvæ and pupæ whence my descriptions are taken.—*Id.*

Occurrence of Platypteryx sicula near Bristol.—I have to record the occurrence, during the last month, of Platypteryx sicula at Leigh Wood, the same locality where the three previous examples of this species were taken. Several beautiful specimens fell to my lot; three specimens were also taken by a friend who was with me at the time. I am not aware of any others having been taken.—*George Harding; Stapleton, near Bristol, July* 13, 1861.

Description of the Larva of Cilix spinula.—When at rest the incrassated anterior extremity slightly elevated, and the head tucked in or bent under, and touching the leaf on which the larva is standing: when handled or disturbed it does not feign death or fall off its food, but remains motionless, clinging with great tenacity to the leaf; in this operation it uses the ventral claspers only, the legs not touching the leaf, and the caudal extremity being elevated. Head prone, with a bifid crown, its divisions conspicuous, but obtuse: 2nd segment with four minute pointed warts, transversely arranged; 3rd segment with two larger dorsal warts, placed transversely; 4th segment with two still larger dorsal warts, also placed transversely; 11th segment with a transverse dorsal protuberance; 12th segment with a pair of minute dorsal warts, placed transversely: every wart terminates in a minute bristle: ventral claspers eight, on the usual segments; caudal claspers aborted, or soldered together and forming a single terminal and gradually attenuated spine or spike, which never appears to touch the leaf on which the larva is feeding, but to be elevated in the air without occupation; at the base of this spike is a minute wart on each side: the body is altogether rugose, and the skin pitted with small depressions. The colour is dingy brown, with a narrow median darker dorsal stripe, and numerous minute rivulet markings, and also a pale lateral elevated line on each side of the 12th segment. Feeds on Cratægus Oxyacantha (whitethorn), and is full fed the first week in July. When full fed it spins a tough gummy cocoon, attaching it to a twig of the hawthorn, generally in the axil of one of the thorns, and fixing, on the exterior, fragments of the still green leaves in such a manner as to conceal the cocoon effectually from sight; in this the pupa remains not longer than two or three weeks: the moth appears on the wing towards the end of July.—*Edward Newman.*

Description of the Larva of Clostera anachoreta. — Does not roll in a ring, fall, or feign death when disturbed; body slightly depressed, having a double skin-fold, extending its entire length, on each side in the region of the spiracles, a prominent median hump on the back of the 5th segment, and a second but less prominent median hump on the back of the 12th segment. Head black, slightly shining, beset with chestnut hairs: body velvety black, mottled and reticulated with smoky gray; a broad median stripe of dingy white down the back; this stripe is composed of square median markings, which are situated respectively on the 4th, 6th, 7th, 8th, 9th, 10th and 11th segments; that on the 4th segment is isolated, but not so clearly defined as the others, which are strung together by four parallel whitish lines, situated in the interstices of the segments; these connecting lines are especially observable when the larva is crawling: the humps on the 5th and 12th segments are bright chestnut-brown; that on the 5th emits a few longish chestnut-brown hairs; and there are a series of markings of a similar colour along each side on the elevations of the skin-folds, both above and below the spiracles: the 5th segment is entirely without the median white mark, its site being occupied by the chestnut-brown hump, and on each side of this is a somewhat square spot of snowy whiteness, and entirely surrounded with intense velvety black: on each side of each of the square white dorsal markings is also a squarish spot of intense velvety black: the back of the 2nd, 3rd and 13th segments have a transverse series of small chestnut-coloured prominences, emitting chestnut-coloured hairs; the belly is pale smoky gray; the legs black; the claspers smoky flesh-coloured. This beautiful larva was first found by my friend Mr. Sidney Cooper, feeding as he believes on Salix capræa (sallow); afterwards by Dr. Knaggs, feeding on Populus nigra (black poplar): Mr. Cooper only took two specimens, not being aware of the value of his capture until the perfect insect emerged: Dr. Knaggs was more fortunate, and, although he obtained but a few individuals, has succeeded in maintaining a succession of broods. To this gentleman I am indebted for the opportunity of describing the larva. In confinement it feeds voraciously on either of the plants mentioned. The two localities given for the insect are certainly calculated (if not designed) to lead our assiduous larva-hunters astray: "in the neighbourhood of London" is literally untrue: "home counties" is within the verge of truth, but conveys no idea whatever of the exact truth. As I have been favoured with a knowledge of the spot under the seal of secrecy, I can say no more on the subject. The specimen kindly given me by Dr. Knaggs spun a tough cocoon between two sallow leaves, on the 14th of July.—*Edward Newman.*

Occurrence of Notodonta bicolor in Staffordshire.—At the ordinary monthly meeting of the Manchester Entomological Society, held on the 3rd of July, Mr. John Smith, an artizan collector resident here, exhibited a specimen of Notodonta bicolor, captured by himself at Burnt Wood, Staffordshire, in the latter part of June last. The specimen, a fine male, though a little rubbed, through being boxed out of the net, excited much interest at the meeting, as being the first of the species known to have occurred in Great Britain proper, and also as somewhat of a reward for their perseverance in the working of a distant locality, of a small knot of entomologists, among whom zeal for the true progress of their favourite study, and the wish to give an unselfish example, are made to supply the places of little means and still less leisure.—*J. Hardy, pro Sec.*

Description of the Larva of Episema cæruleocephala.—Will not roll in a ring, feign death, or fall off its food when handled or disturbed, but clings with greater tenacity, drawing in and trying to conceal its head; head small; body almost uniformly cylindrical, transversely wrinkled. Head glaucous or blue-green, with two black spots on the crown: general colour of the body glaucous-green above, tinged with smoke-colour, and having a median rather broad yellow stripe interrupted at each junction of two segments; on each side, just below the spiracles, is another yellow stripe, seated on a longitudinally raised fold of the skin; below this the body is smoky green, shading off to yellow-green on the belly: on every segment are numerous black warts, each of which emits a single black bristle; the most conspicuous of these warts are four on the back of every segment; the anterior nearer together than the posterior pair: the yellow median stripe passes between them, leaving two on each side: each of the warts seems to acquire a greater intensity of colour from its being surrounded by a paler space: the legs are shining, glaucous and black-spotted; the claspers opaque green, with two black spots on each. It feeds on Cratægus Oxyacantha (whitethorn), and is full fed about the middle of June, when it spins an oblong cocoon, formed of minute particles of the rind of the whitethorn twigs, small fragments of the green leaves, and an abundance of silk; this is generally attached to the under side of a hawthorn twig: in this it changes to a pupa, and remains in that state about two months, the moth commonly appearing in September.—*Edward Newman.*

Description of the Larva of Charadrina Alsines. — Before last moult:—Back and subdorsal parts dusky purplish brown. Sides and belly yellowish gray. Central dorsal line whitish. Subdorsal line edged with black. Central line bordered on either side of each segment by a large black tubercular spot. Spiracular line waved, blackish. Between subdorsal and spiracular lines a row of blackish tubercular spots, smaller than the dorsal ones. Both dorsal and lateral tubercles surmounted by a longish white hair. Head dusky yellowish brown. Belly mottled on the sides with dusky markings. After last moult: — Ground colour pale reddish drab or buff. Back more or less tinged with purplish brown. Central dorsal line whitish, bordered with black at the centre of each segmental division. Tubercular spots as before. Subdorsal lines yellowish white, edged on the upper side narrowly, and on the lower side broadly, with black, and dotted on the former, on each segment, with a yellow tubercle having black centre. Spiracles enclosed in a dusky space between two black lines. Tubercular hairs yellowish. When very young the ground colour is a uniform pale yellowish gray. Central dorsal and subdorsal lines white, the latter indistinct. Spiracular line blackish. Dorsal and lateral tubercles very small and indistinct. The larvæ from which the foregoing description was taken were reared from eggs laid by moths taken by myself in August. They were hatched in about six weeks, and fed throughout the autumn and winter on Alsine media (chickweed). They were full fed in March. Pupa bright red, short and stout, enclosed in a tightly-spun earthen cocoon.—*H. Harpur Crewe; The Rectory, Drayton-Beauchamp, Tring, July* 15.

Description of the Larva of Charadrina blanda.—When quite young this larva is not distinguishable from that of C. Alsines, but after a few moults they may be separated with the greatest ease. Before last moult: — Ground colour reddish gray or buff. Down the centre of the back a series of fig or mushroom-shaped dusky blotches, intersected by a whitish central line edged with black. Subdorsal lines whitish, edged with black on the lower side. Space between subdorsal lines and spiracles dusky. Spiracles and spiracular line black, the lower edge of latter buff. Dorsal, subdorsal and spiracular lines studded with very small scarcely perceptible tubercles, each surmounted by a whitish hair. Head buff. Belly destitute of markings. After last moult: — Ground colour yellowish buff or drab. Back slightly marbled with black. Central dorsal line yellowish, edged with black, and entirely black at the centre of each segmental division. Subdorsal lines very slender and faint, black or dusky brown. Immediately below the latter a broad, distinct, dusky line. Spiracular line blackish. Spiracles black, in a white ring. Space between subdorsal and spiracular lines dusky. Belly greenish yellow. Tubercles and tubercular hairs as before. These larvæ were hatched in September, from eggs laid in August, and fed all through the winter on Alsine media, being full fed in April. Pupa bright red, similar to that of C. Alsines, enclosed in a tightly-spun earthen cocoon.—*Id.*

Occurrence of Agrotis lunigera at Torquay. — I have had the pleasure of taking both males and females of the beautiful and very local Agrotis lunigera this summer, at Torquay, at sugar. Some of the females are quite black, and others of a beautiful rust colour.—*George King.*

Description of the Larva of Noctua neglecta.—Rolls in a ring and falls off its food-plant, feigning death when disturbed; crawls very actively, often moving the anterior part of the body in the manner of a leach. Head rather small, shining: body uniformly cylindrical, velvety. Colour, including the head, uniform dull brown or uniform pale green, in both instances having a very slender and very obscure pale median stripe down the back, and a very distinct broader white stripe on each side immediately below the spiracles. The dorsal region is thickly dotted or reticulated with a darker colour. Feeds in the night time, on Calluna vulgaris (common ling), and is full fed at the end of May: it then enters the earth to undergo its change to a pupa: the moth appears in August. I am indebted to Mr. Thomas Huckett for this larva, as well as that which follows.—*Edward Newman.*

Description of the Larva of Tæniocampa stabilis.—Does not roll itself in a ring when touched, but falls off its food-plant, and twists itself violently, bringing head and tail together alternately on each side. Head rather large: body uniformly cylindrical, quite smooth. Head pellucid shining glaucous-green: body delicate, clear bright green, velvety, with a slender pale median stripe on the back, very indistinct, but rendered perceptible by the action of the dorsal canal; a narrow transverse yellowish band crosses the back of the 12th segment; the dorsal surface mottled with indistinct paler dots; the ventral surface glaucous-green, unspotted. Feeds on Quercus Robur (oak), is full fed in the beginning of July, and changes to a pupa on the surface of the earth, perhaps spinning a few silken threads, but making nothing that can be properly called a cocoon. The moth does not appear until the following March.—*Edward Newman.*

Description of the Larva of Tæniocampa munda.—Falls off its food, rolls in a ring and feigns death when touched or disturbed. Smooth, uniformly cylindrical. Head nearly equal to the body in diameter, pale, very shining, wainscot-brown, mottled with black in the middle of the face, and reticulated on the cheeks. Ground colour of the body putty-white, mottled or sprinkled and obscurely reticulated with velvety black; median area of the back paler, almost assuming the appearance of a broad pale dorsal stripe, and on each side of this stripe is a series of small circular pure white spots; these are three in number on each segment, and are not arranged in a direct line, the middle one of each three being slightly nearer a median line of the back than either of the others; an intensely black, but not clearly defined, narrow, waved black stripe extends the whole length of each side, and immediately below this is a pale area, and in this area are small white patches on the 4th, 5th and 6th segments; the dorsal surface of the 12th segment is very dark, except on its posterior margin, which is pale; legs and claspers pale; last pair of claspers spreading; belly smoky gray. Feeds on Quercus Robur (oak) and plum, and is full fed at the end of May. I am indebted to the Rev. J. Hellins for the opportunity of describing this larva.—*Id.*

Description of the Larva of Orthosia Upsilon.—Rolls itself into a lax ring when disturbed, and falls off its food-plant, but very soon abandons this posture, and crawls with great vigour and almost incredible activity; head small; body uniformly cylindrical, smooth, velvety. Head shining, pale brown, reticulated with darker brown; body brown, with a median series of somewhat shuttle-shaped pale markings, placed end to end, and forming an almost continuous stripe: there is a slightly paler stripe on each side, including the spiracles, which are situated just within its upper margin: the dorsal area, as far as this lateral stripe, is variegated or marbled with velvety black: the belly and claspers are paler. Feeds by night, on Salix Russelliana (the Bedford willow) and other narrow-leaved species of the same genus; descending in the morning to the ground, or concealing itself in a crevice of the bark: on the approach of night these larvæ leave their hiding-places, and crawl up the trunks of the willows, travelling at a great rate, and in windy weather invariably keeping on the lee side of the trunk: they are full fed at the end of May, when they finally descend to the ground, and change to pupæ in a slight cocoon on the surface of the earth. The moth appears in July, and may be observed flying in great abundance round the tops of willows, especially in the rope-walks near London: it probably lays its eggs on the topmost twigs. I am indebted both to Mr. Wright and Mr. Huckett for this larva.—*Id.*

Occurrence of a new British Noctua in Ireland.—Mr. C. G. Barrett has again been successful in taking an Hadena new to Britain, at light, in Ireland. It has a great resemblance to Hadena Protea, but is considerably larger: the name will be ascertained, and published in the 'Zoologist' as soon as practicable.—*Id.*

Proceedings of Societies.

Entomological Society.

July 1, 1861.—G. R. Waterhouse, Esq., V.P., in the chair.

Donations.

The following donations were announced, and thanks ordered to be presented to the donors: 'Exotic Butterflies,' Part 39; presented by W. W. Saunders, Esq. 'Journal of the Proceedings of the Linnean Society,' Vol. v. No. 20, and second supplement (Botany); by the Society. 'List of the Specimens of Lepidopterous Insects in the Collection of the British Museum,' by Francis Walker, F.L.S., &c., Part xxii. (Geometrites); by the Author. 'The Zoologist,' for July; by the Editor. 'Liste des Hyménoptères Recueillis en Sicile par M. E. Bellier de la Chavignerie, pendant les mois d'Août et Septembre, 1859,' par le Dr. Sichel; by the Author. 'The Journal of the Society of Arts' for June; by the Society. 'Stettiner Entomologische Zeitung,' Vol. xxii. Nos. 4—6; by the Society. 'The Entomologist's Weekly Intelligencer,' Nos. 240—247; by H. T. Stainton, Esq. 'Report of a Lecture delivered by J. O. Westwood, Esq., M.A, F.L.S., Hope Professor of Zoology in the University of Oxford, on the Metamorphoses of Insects, at the Royal Institution of Great Britain, on Friday, May 24, 1861; by the Author. 'Pocket Catalogue of British Coleoptera;' by the Author, G. R. Waterhouse, Esq.

Vote of Thanks.

A cordial vote of thanks was passed to W. Wilson Saunders, Esq., for the liberal entertainment provided by him on the occasion of the Society's excursion to Reigate, on the 21st ult.

Election of a Subscriber.

Robert Hackshaw, Esq., of Merton Road, Kensington was balloted for, and elected a Subscriber to the Society.

Exhibitions.

Mr. Baly exhibited the type specimens of the new species of Hispidæ in Mr. Bowring's collection, described in the first part of the 'Catalogue of Hispidæ,' prepared by him for the Trustees of the British Museum.

Sir John Hearsey exhibited a large box of Indian insects of various orders, being a portion of the collection made by him during his recent service in that country.

Professor Westwood remarked that the box of insects exhibited by Sir John Hearsey contained many fine species, especially of butterflies, peculiar to Assam and the Darjeeling district of the Himalayas; likewise a specimen of Necroscia Tages, a spotted winged species of Phasmidæ, hitherto unique in the Hopeian Collection, as well as one of a new genus of Actetidæ of considerable size, also hitherto unique in the same collection; also specimens of each sex of the remarkable Lamellicorn Peperonota Harringtonii of Westwood, and a fine new Prionideous insect with spotted elytra.

Mr. F. Smith exhibited a specimen of the singular bee parasite Braula cœca, *Nitzsch.*, found in Devonshire on Apis Liguria. He stated that the species had not hitherto been recorded as an inhabitant of Britain; on the Continent it was found on the common honey bee, Apis mellifica, and it was rather singular that it was observed for the first time in this country on the recently imported species A. Liguria.

Professor Westwood observed that Germar's figure of this bee parasite was very indifferent; the best figure had been published in Italy, by M. Achille Costa, under the name of Entomobia apum (Storia completa del Entomobia apum e su i danni che arreca alle api da Miele; atti del R. istituto d'incoraggiamento, vol. vii. 1845).

Mr. Haward exhibited a series of specimens of Tillus elongatus, and suggested the probability of the dark individuals being specifically distinct.

Mr. Janson observed that Fabricius had described the so-called variety, having the thorax dark, under the name of "ambulans."

Mr. Haward remarked that he had captured thirty-seven examples of Ammæcius brevis under one clod of dried horse-dung, which circumstance he considered indicated its affinity to Aphodius.

Mr. Stevens exhibited some examples of Ceutorhynchus Crux, C. setosus, C. hispidus, &c., lately taken near Mickleham.

Mr. Stevens also exhibited some fine Lepidoptera, sent from the Cape of Good Hope, by Mr. R. Trimen.

Mr. Stevens announced that Mr. Trimen was about to publish a work on the butterflies of South Africa, to be intituled 'Rhopalocera Africæ Australis,' and added that he should be happy to receive the names of any members who might wish to become subscribers to this work, which it was intended should be completed in two parts, at five shillings and sixpence each.

Dr. Knaggs exhibited a drawing of the larva of Acidalia strigilata, made the day before it commenced forming its cocoon, and being the only one which he had succeeded in rearing from the eggs obtained by him last season.

Mr. Stainton exhibited a singular larva, mining in birch leaves, which he had received from Scarborough. The mine began at the tip of the leaf, became gradually broader till it swelled out into a blotch in the centre of the leaf, where the larva cuts out a round case formed of the two skins of the leaf. Mr. Stainton said he would not express an opinion as to the order to which the insect belonged; he had brought it for exhibition, in the hopes of getting some information concerning it, but he might remark that the mine more nearly resembled that of Tinea bistrigella than any other mine he knew.

Mr. Stainton also exhibited drawings of the singular gall-like swellings of the stems of Silene nutans, formed by the larvæ of Gelechia cauligenella. Mr. Stainton remarked that there was nothing abnormal in the appearance either of the larva or perfect insect, though its habits were so singular. There was no apparent opening into the gall, the larvæ evidently effecting their entrance there whilst very young and when the plant was beginning to grow up. When the larvæ were full fed they ate their way out of the gall.

Mr. McLachlan exhibited a series of a rare Trichopterous insect, Limnophilus incisus of Curtis = Colpotaulius excisus of Kolenati. These he took near Merstham, on the 21st ult.

Mr. McLachlan also exhibited a long series of Acentropus niveus, among which were two female examples, taken recently at the Hampstead Ponds, a new locality for this species; also bred specimens (with the cases) of Coleophora olivaceella, and the same of C. solitariella for comparison; and a bred specimen of Nepticula ulmivora, the larvæ of which, mining in elm leaves, he recently discovered for the first time in England, near West Wickham.

Captain Cox exhibited some excellent drawings of the larvæ of Lepidoptera, and remarked on the rarity of Lepidoptera during the present season, which was probably to be attributed to the cold and wet of the last summer.

Mr. Waterhouse observed that he never remembered to have seen so few Coleoptera as in the present summer; and Mr. Smith stated that Hymenoptera had hitherto been extremely scarce; other members present remarked that their experience confirmed these statements.

Professor Westwood observed that although mangold wurzel was usually considered almost free from insect attacks, yet the crops this season in many distant counties (Devon, York, Hereford, Oxon, &c.) were attacked by the larvæ of a Dipterous insect (fam. Muscidæ, and probably allied to Tephritis), which mine into the leaves, forming large blotches, which soon shrivel up. It was evident, therefore, that the previous season had exerted no influence in checking the production of this obnoxious species, and in like manner the Aphis of the cherry and plum, and the black Aphis of the bean, as well as the gooseberry sawfly, had been most extensively abundant and injurious this season.

Mr. McLachlan read the following:—

Remarks on the Supposed Influence of the Food of the Larvæ in causing Variation in Lepidoptera.

"The Natural History of Coleophora olivaceella appears to have some bearing on the question so often asked at our meetings, 'Are not many of the so-called species of Micro-Lepidoptera merely modifications of one or more previously described species produced by the larvæ having fed on different plants?' It appears to me that, as has often been said before, this question would never have arisen but for the almost microscopic dimensions of the creatures; and at the same time I would premise that I am decidedly opposed to the creation of species on imaginary differences, and that it is possible that some few, now considered distinct, may, when their habits become more known, sink to the rank of varieties; but that food has any more than the very slightest influence in causing such variation is, I think, very doubtful. Coleophora olivaceella is an insect which, in the perfect state, is very similar to C. solitariella, and, moreover, the two larvæ feed for at least the greater portion of their existence as such simultaneously on the same plant (Stellaria Holostea); but the cases of the larvæ and their mode of feeding are so very different that all who believe in species at all must consider them distinct. These differences are not worth pointing out here; they have already been elaborately detailed by Mr. Stainton in the 'Entomologist's Annual' and 'Intelligencer,' and by M. Fologne in the 'Transactions de la Société Entomologique Belge.' Take again Nepticula ulmivora, which is extremely similar to N. marginecolella, and both larvæ mine at the same time in elm leaves, sometimes sharing the same leaf, yet the larvæ differ in colour, and mine in a distinct method, and each larva invariably produces an imago having small though constant distinctive characters, so that no one can believe them identical.

"Similar instances might be multiplied among the Micro-Lepidoptera almost *ad infinitum*. Yet it is constantly hinted that two insects, which—in addition to having equal peculiarities with those before mentioned—feed in a different plant, may be only varieties of one caused by the latter circumstance. Now, on the contrary, does it not seem more natural to suppose that, if there were doubt about the matter, this should rather turn the scales, and cause us at once to consider them distinct? In many genera in which the individual species vary the least the larva of each species affects many different plants, the specimens bred differing only slightly in size and depth of colour. And, again, as far as my small experience goes, the species of other genera have each their own food-plant, or perhaps frequent one or two closely allied species. That differences so great as even to be called varieties can be produced by change of food I must believe to be impossible. All who have paid any attention to breeding Lepidoptera will readily say how impossible it is to produce varieties at will, and how an occasional specimen will make its appearance with such peculiarities of form and markings that, had it been taken at large, with no knowledge of its previous history, it would have stood a fair chance of remaining undetermined or described as new, but which has been bred from the same brood of eggs kept under precisely the same circumstances. And certain species of Peronea are familiar instances of the imago varying to such an extent that scarcely two can be found precisely alike, while the larvæ feed on the same plant and present no differences. On the other hand, in certain genera, for instance Eupithecia, in many species the larvæ, though reared from the same brood of eggs and fed together on the same plant, will vary as much as the imago of Peronea, yet the perfect insects produced from these are identical in appearance. From these and a thousand other instances that might be cited, it does appear to me that variation caused by the food of the larva does not exist, except as to size and tone of coloration, and that any differences in the the number, position and direction of fasciæ or spots, in which consist the distinctive characters of most of the Micro-Lepidoptera in question, can be caused by this means is, as said before, open to the gravest doubts. That such variation can be caused in one or two generations seems to be quite impossible; and, supposing that any influence can be exercised in this way, it could only be in the course of ages, which theory, however ingenious, and perhaps truthful, it may be, is unfortunately from its very nature incapable of proof."

Professor Westwood observed, with reference to the views advanced by Mr. McLachlan, in the paper just read, that he had endeavoured to guard himself from misapprehension in speaking of the modification of species produced by change of food. He had indeed given it as his opinion that such a change was capable of occurrence in certain species, although he was in no position to attest it as a fact. In stating that it was difficult to meet this argument, owing to the minuteness of the Micro-Lepidoptera, Mr. McLachlan had overlooked the fact of the great variation occurring in the largest species of Papilio, as well as Mr. Bates' statement of the variation of the Amazonian butterflies, produced, as had been supposed, by a comparatively small geographical range, but which Mr. Westwood was inclined to attribute to other causes, seein that in Africa the same species ranges unchanged over a great part of the continent. He considered that careful experiments as to the powers of modification of species resultin from variations of food would produce important results. He had looked in vain for any structural variation in many of the larvæ of the same genera published b Mr. Stainton, a difference in colour and a variation in the form of the mine or cas (all of which might be induced by the variation of the leaves on which the insect fed) being in many cases the only appreciable differences.

Mr. Desvignes communicated a paper intituled "Descriptions of New Species o Bassus."

Part IX. of the current volume of the Society's 'Transactions' was announced published.—*E. S.*

Young Cuckoo Fed both by a Song Thrush and Hedgesparrow.—A curious and interesting fact came under my notice a few days ago at Catteshall, near Godalming. A young cuckoo had been caught in the garden and confined in a wicker cage, in which it was fed by a song thrush and a hedgesparrow, both of which birds had continued their attentions for about a fortnight, when the thrush abandoned the foster child to the exclusive care of the hedgesparrow. I have since learned that some juvenile thrushes had been confined in the same wicker cage, so that the thrush possibly supposed she was administering to the wants of her own progeny.—*Edward Sweetapple; Hurstbourne Mill, Whitehurst, Hants, July* 6, 1861.

Dianthecia capsophila.—M. Guenée has seen the Irish Noctua taken last year by Mr. Barrett, and recorded in the 'Zoologist' under this name. The eminent French Lepidopterist pronounces the name to be correct: it is the true D. capsophila.—*Edward Newman.*

New British Leucania.—Mr. G. R. Crotch has taken a Leucania which, without close examination, might easily be mistaken for L. pallens, but appears quite distinct. —*Id.*

The occurrence of the Shore Lark, the continued Life-History of Sawflies, the Life-History of the Orange Coccus, and other interesting papers unavoidably stand over.

To Entomologists.

COPIES OF WATERHOUSE'S CATALOGUE OF BRITISH COLEOPTERA, stitched and put up in a paper cover, may be obtained by applying to Mr. Charles Waterhouse, British Museum, W.C., who will forward them per post, if not otherwise directed. They may be paid for by *penny*-post stamps.

Price 7s. 6d.; or, if printed on stout paper, and on one side of the paper only, for labelling Cabinets, 8s. 6d. This latter edition has no index.

THE POCKET CATALOGUE OF BRITISH COLEOPTERA, by the same Author, may be obtained in the same manner. Price 2s.

The former of these two Catalogues contains the leading synonyms of each species, and includes likewise references to the specimens in Stephens' and some other public collections. In the "Pocket Catalogue" synonyms are given only in cases where new species are added, or where any change is made in the name adopted in the Synonymic Catalogue.

Price Sevenpence, post free,

SUGGESTIONS for FORMING COLLECTIONS of BIRDS' EGGS.—These 'Suggestions' are from the pen of Mr. Newton, than whom no one was ever better qualified for the task. The first object is to identify the egg, to be quite sure to what bird it belongs. Mr. Newton justly considers that an egg wrongly named is worse than no specimen at all. As soon as the egg is positively identified the next object is to authenticate it, by attaching such a mark as can neither be removed nor obliterated. Then follows a full and most minute description of the mode of blowing eggs, with figures of all the instruments necessary to be used: it is expressly explained that no hole should be visible, and it is also explained how to avoid this: on no account whatever should there be a hole at either end, and there should be but one hole. The difficulty of removing the contents from eggs that have been sat on and nearly hatched is entirely overcome; and the proper instruments to use are not only described but figured, and the requisite information is given where they may be obtained. Finally, we are shown how to strengthen the shell of delicate eggs before drilling the hole through which their contents are to be emptied.

E. Newman, 9, Devonshire Street, Bishopsgate, London, N.E.

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